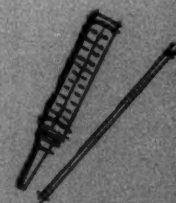
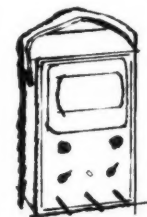
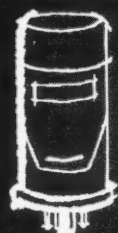
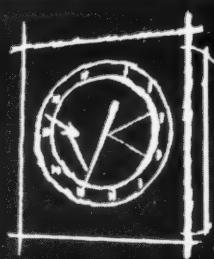
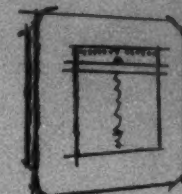
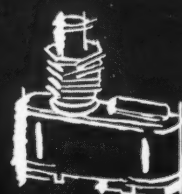
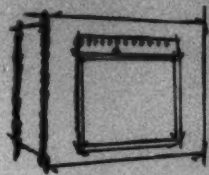
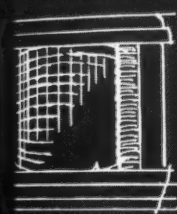
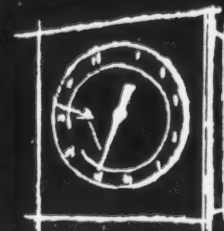
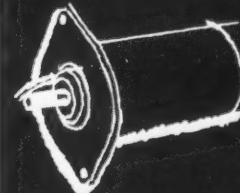
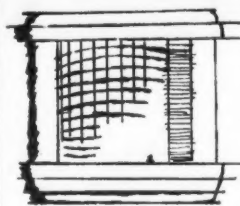
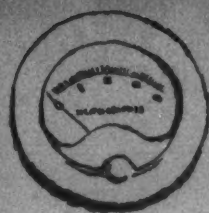




For Men Who Manage

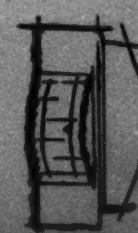
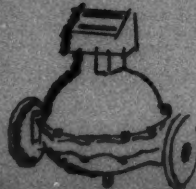
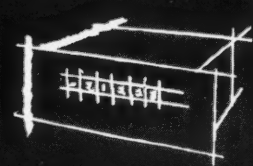
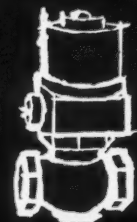
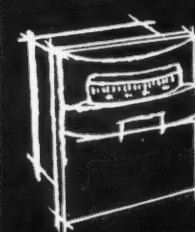
SEPTEMBER 1956

# chemical processing



INSTRUMENTATION  
AND CONTROL

This month's  
featured section  
begins on page 53

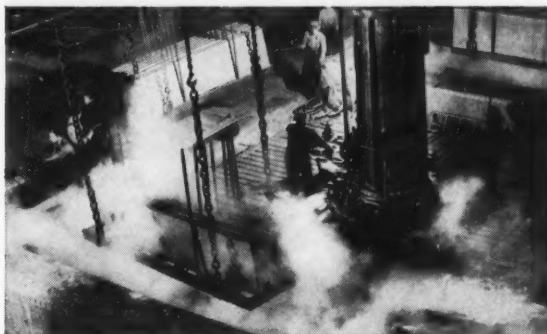


Why is this magazine so "different"?  
THE EDITORS EXPLAIN - PAGE 100

**ANHYDROUS** Hydrofluoric Acid for alkylation catalyst; also catalyst and fluorinating agent in many other organic and inorganic reactions.



**AQUEOUS** Hydrofluoric Acid for steel pickling, glass frosting and etching; also for electropolishing of metals, ore flotation, manufacture of other chemicals.



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When inquiring check 7302 opposite last page

**THAT'S  
INTERESTING**

## Underwater market for aerosols?

Playing on fishes' sense of smell, an aid to fisherman is now on the market. Three-ounce aerosol containers of "Odor Action" come in five flavors . . . presumably de-



"I know it smells good Junior, but think of your future!"

licious to trout, salt water fish, carp, bass and pan fish, and catfish. Manufacturer Robert J. Kerr Chemicals, Inc., Park Ridge, Ill., reports that a single spraying will aromatize a casting plug for three or four hours, a trolling lure for one or two. Spray can be used on bait for still-fishing, too. It's legal for use in all states.

## "Dragon fur"— a cure for chassis squeaks

Not the pelt from some mythological beast but tetrafluoroethylene fiber woven into nylon or cotton backing. This development of E. I. DuPont and American Metal Products Co., Detroit, Mich., is being used in ball-and-socket suspension joints to give lubrication that will last the lifetime of the car or machine with no increase in cost.

Tests have shown that joints lined with this "dragon fur," as it was dubbed by its developers because of its extreme durability, reduce both starting friction and running load by more than half when compared to a standard lubricated joint. Assemblies are currently on test. (OPD Reporter)

## Personal comfort

Two new additions to the booming aerosol parade: The first, for milady, a deodorant talcum powder perfumed and containing hexachlorophene. It is being marketed by Eppi Products Corp. as "Girdle Spray", sort of a high-fashion lubricant.

The second provides asthma sufferers with an easy, effective way of orally administering a measured dosage of finely atomized medication. Aerosol dispenser consists of a plastic breathing tube and a small replaceable vial of therapeutic agent combined with a liquefied gas propellant that provides dispensing pressure. Small enough to be carried inconspicuously in the packet, "nebulizer's" advantage rests in the measured dosage it permits.

(Please turn to page 271)



# chemical processing

with which is combined  
CHEMICAL PROCESSING PREVIEW  
and Chemical Business

*for men who manage*

Vol. 19

September 1956

No. 9

Serving more than 45,000 circulation in these industries:

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SEPTEMBER 1956

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W-8

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Over  
the editor's  
shoulder

**"The Instrument Situation"  
(or ain't progress relentless!)**

We hope you like the cover on CHEMICAL PROCESSING this month. If you'll look at it for a second you'll recognize all or most of the instruments sketched there. These instruments, of course, belong there because this issue features Instrumentation and Control.

Have you noticed how many new instrument developments there have been recently? If instruments are your professional dish, you no doubt have. It's a cinch the editors of this magazine have. Each succeeding issue seems a little more difficult to write than its predecessor.

Why is that? Because of these very same instrument developments. Our editors used to be able to depend on their plant experience to fit just about every new instrument into its practical, work-a-day niche. But today . . . well, have you figured out what digital magnetic memories have to do with *your* chemical products yet? And still you may feel (as we do) that these unfamiliar instrument developments do have a place in the future of chemical processing.

We've tried to steer the middle course in putting together the featured Instrument section which starts on page 53. We have certainly not neglected the practical instruments (like those on the cover) . . . and we have tried to fit their newer cousins into the proper place.

If you, too, feel that "the instrument situation" is getting out of hand, you may want to let us know how we can better fill your needs in the future. We want to hear from you . . . even if you think we'd better take a new slant.

*Bruce Fader*

Associate Editor

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page
- The product directory, pages 261 to 264, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opp. last page

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#### THIS MONTH'S COVER

Instruments in profusion: the theme of CHEMICAL PROCESSING'S September cover echoes the growing number and diversity of instruments available for process control. You'll find a roundup of new instrument developments in the featured section starting on page 53.





September 5-7. National Agricultural Chemicals Association, Annual Meeting, Essex and Sussex Hotel, Spring Lake, N. J.

September 8-12. American Institute of Chemical Engineers, William Penn Hotel, Pittsburgh.

September 11. Synthetic Organic Chemical Manufacturers Assn., Monthly Luncheon, Roosevelt Hotel, New York City.

September 16-21. American Chemical Society, 130th National Meeting, Atlantic City.

September 16-21. American Society for Testing Materials, Pacific Area National Meeting and Apparatus Exhibit, Statler Hotel, Los Angeles.

September 17-22. 11th Annual Instrument-Automation Conference and Exhibit, Instrument Society of America, New Coliseum, New York City.

September 23-25. Drug, Cosmetic and Sundry Show, Pharmaceutical Council of Greater New York, Statler Hotel, New York City.

September 24-28. Trade Fair of the Atomic Industry, Navy Pier, Chicago.

September 26-28. Chemical Market Research Assn., discussion on "Canadian Chemical Economy," Chateau Frontenac Hotel, Quebec City, Quebec.

September 27-29. Drug, Chemical and Allied Trades Section, New York Board of Trade, Annual Outing, Pocono Manor Inn, Pocono Manor, Pa.

October 3-4. Eleventh National TAPPI Plastics-Paper Conference, The Institute of Paper Chemistry, Appleton, Wisc.

October 8-11. TAPPI Engineering Conference, The Institute of Paper Chemistry, Appleton, Wisc.

October 15. Salesmen's Association of the American Chemical Industry, Sales Clinic, Commodore Hotel, New York City.

October 15-17. National Association of Corrosion Engineers, symposia on protective coatings, metals and alloys, cermets and plastics, use of statistical methods, Drake Hotel, Philadelphia.

October 21-24. Federation of Paint and Varnish Production Clubs, Annual Meeting, Cincinnati, Ohio.

October 22-25. 44th National Safety Congress and Exposition, Conrad Hilton Hotel, Chicago.

October 23-25. National Protective Packaging and Materials Handling Exposition, Kiel Auditorium, St. Louis.

November 12-14. National Paint, Varnish and Lacquer Assn., Annual Convention, Statler, Ambassador, and Biltmore Hotels, Los Angeles.

November 26-30. 22nd National Exposition of Power and Mechanical Engineering, The American Society of Mechanical Engineers, New Coliseum, New York City.

November 27-30. 9th National Chemical Exposition, Public Auditorium, Cleveland.

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In June, Mr. Greenewalt spoke before 700 top men of the chemical processing industries, assembled for the 84th annual meeting of the Manufacturing Chemists' Association, Inc., at White Sulphur Springs, W. Va. His characteristically concise and astute presentation sounded a strong note for optimism in plotting the future.

Because of the timeliness of his remarks, **CHEMICAL PROCESSING** presents them here in their entirety. Those of you who missed the talk should particularly profit by the inspiration it provides. But even if you were present, a second "glance", in print, will be well worth your reading time.

**CRAWFORD H. GREENEWALT**

President

E. I. du Pont de Nemours & Co., (Inc.)

## THE VENTURESOME OPTIMIST:

*key to a thriving economy*

**W**hen I began to think about what I might say to you this morning I realized what a tough job I had undertaken. I suppose I do know something about chemistry and the chemical industry but if I were to address you on that subject it would be like carrying coals to Newcastle, or perhaps more appropriately, like carrying chlorine to Midland or styrene to Texas City.

I finally decided to compromise by talking to you about short-term and long-term economics. Please don't think that this implies that I consider myself expert on that subject for that is certainly not the case. I have noted, however, that economics is so inexact a science that no one can with any honesty qualify as an expert and so I can hide behind the fact that one opinion after all may be as good as another.

There are few elements of economic life in our country that receive so much attention as the short-term fluctuations in business activity — we seem even to have acquired a sort of national neurosis in this area. The pulse of the business system is examined hourly, and widespread attention is given to each diagnosis. If June carloadings are a few percentage points below those of the previous year or previous month, the fact is noted and appraised in much the same way as we might follow the progress of an ailing child. We are quick to find cause for rejoicing when the signs point upward, and just as quick to worry and fret when the indications are contrary.

It is an odd circumstance that when Mr. Curtice tells us that his industry is likely to sell 5,800,000 cars in 1956 the emphasis in the press is all upon

the fact that this is down fifteen or so percent from 1955, and not on the equally undoubted fact that 1956 may well be the third highest year in the history of the industry.

The peaks and valleys which many see as the characteristic topography of capitalism have engaged the attention of its advocates and its foes for many years. More than a century ago the Reverend Malthus concluded that a certain amount of instability was probably unavoidable, and expressed a most jaundiced view of the future. A generation later, Karl Marx was predicting even more frightening consequences from the swings of fortune which he, too, regarded as inevitable. At one time the theory was advanced that periodic upheavals in the economy were the results of sun spots and, as such, beyond the reach of either



prevention or cure. Today some economists seem to maintain that there is an inherent instability associated with capitalism which causes it to vibrate violently, no matter what we do to prevent it.

#### Economic ups and downs are unavoidable

While I do not feel that a recurrence of business paralysis is either regular or inevitable, it is certainly true that some variations must be expected. The question is largely one of degree. If we can iron out the extremes and ease the velocity of change I think we will have given the system the only kind of stability which is compatible with its essential nature.

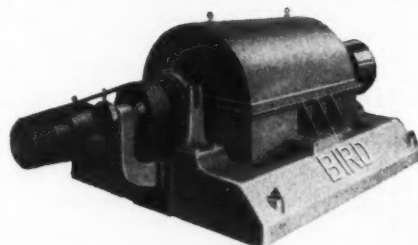
The fact is, of course, that there is nothing very remarkable in the ups and downs of economic activity, for there are few human adventures in which we are not obliged to accept a certain amount of lean along with the fat. I doubt very much whether any creative activity could be carried on with predictable results and an even tenor of performance — if it were so the quality of inspiration would long ago have lost its potency. I am inclined to think that any venture which tried too hard to avoid all the low spots would never climb very high into the hills.

It seems to me that the economists, learned men that they may be, have invariably regarded the economic particles under examination as though they were subject to precisely predictable patterns. The truth is that the elements comprising our economy, being human, have motivations and volitions and drives all their own. They are, in short, simply a multiplicity of human decisions and are, thus, subject to many unrelated, perhaps irrational, influences.

Human behavior, in other words, can be predicted only to the extent that, in the end, it will prove unpredictable. People, for some reason, decline to follow logical patterns and resist being marshalled into the neat, mathematical formulae devised for them. Our behavior with respect to the economic problems of any given day depends upon millions of personal decisions — in the board rooms of our industries and in the living rooms of our citizens. These are decisions which may involve the commitment of millions of dollars in the construction of a new plant, or of a few dollars for the purchase of a new dress, and the difference between the two is largely one of scale. There is, of course, a theory that business decisions are immune to the psychological and environmental factors which guide personal expenditures. If this is true, it can mean only that automation has achieved its zenith and that management decisions are no longer rendered by human beings.

It may be noted that in Karl Marx' time there was  
(Please turn to page 257)

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centrifugal  
filter can  
handle  
almost  
any job



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**3 PPM in textile sizing solution**  
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Section 260-1C, Waterford, N. Y.**

Please send me a free sample of G.E.'s new silicone ANTI-FOAM 60.

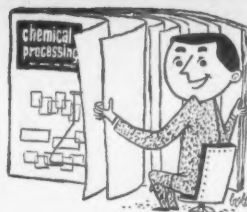
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IN CANADA: Mail to Canadian General Electric Company, Ltd., Toronto

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

When inquiring check 7306 opposite last page



*looking ahead*

*to next month...*



Technician checks results of Weather-O-Meter tests on sample tile formulations

### Indestructible colors?

Among the plastics in the home, few take more of a beating than vinyl-asbestos floor tile. Heat and light, frequent moppings, a wide range of detergents . . . all these require pretty high performance from the vinyl's color stabilizer so that tiles will keep their bright colors through years of use.

Congoleum-Nairn, manufacturer of plastic floor covering materials, tested many hopefuls in its Kearny, N. J., research labs. Among other requirements, the stabilizer needed to withstand process temperatures of 300°F. After over 40 materials were tested, an organo-tin compound got the nod.

Assistant Editor Frank McElroy asked the questions, Louis Caldarell of Congoleum-Nairn's lab gave the answers, and you'll find the result in **CHEMICAL PROCESSING's** Material section for October.

### Brrrrrr !!

How do you get temperatures below -300°F with the degree of efficiency and flexibility necessary for production of low-cost anhydrous ammonia? To liquefy air for nitrogen distillation you'll need to get down to -313°F and separation of impurities from the hydrogen-rich gas requires -317°F.

After a visit with W. O. Hoffman, Atlantic Refining's Chemical Department Superintendent, in Philadelphia, Associate Editor Gordon Weyermuller describes Atlantic's heat exchanger problem — and solution — in next month's New Solutions section.

### Warehouse space problems?

Seem to be getting a little cramped in your warehouse space? Is needed material always in the back . . . storage turnover getting out of control?

Parke-Davis, in Detroit, faced the same sort of problem. Space limitations caused finished stock to be stored in a basement and handled with "walkie" trucks . . . stacking material only one high.



Parke-Davis found the answer to its space problem in a tiering truck designed for use in narrow aisles and cramped areas. Assistant Editor Ted Wett, shown talking with Industrial Engineer Al Gavern (right), tells in next month's Material Handling section how it helped P-D and how it might help solve your space problem.

### Temperatures to 700°F — held to ± 2°

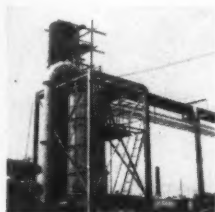
Processing of a food emulsifier, at Hercules Powder's Memphis plant, required transfer from one vessel to another — but required that temperatures be held to extremely precise limits. With temperatures ranging from



Here's a quick preview  
of features you'll find  
in October **CHEMICAL PROCESSING**

250 to 700°F, departure of only a few degrees from the critical temperature can cause serious impairment to color, odor, or taste qualities of the product. This all called for the highest efficiency in insulation of piping, valves, fittings and vessels.

Next month's New Solutions section tells what was done and how the insulation selected holds temperature within the prescribed limits as well as keeping fuel requirements to a minimum.



#### Beating smog at the source

Fumes and smoke resulting from manufacturing of porcelain enamel frit — within a few hundred feet of a residential area in smog-troubled Los Angeles

— posed something of a problem. Building a 250-foot stack was the obvious — but not the best — solution.

Ferro Corporation found the answer in a 20-jet scrubber, keeping the effluent well within boundaries set by Municipal Code. Assistant Editor Bill Clarke talked with Ferro's Chief Chemist M. Bozsai, took the pictures, and tells about the operation in October's Processing Equipment section.

#### Private phones speed communications

Coordination of 13 manufacturing operations spread over 12 acres can be a big problem. American Chemical Paint Co., Ambler, Pa., has come up with a solution . . . a 100-line private telephone system. Operated at less cost than conventional phone service, the system keeps management in touch with manufacturing centers throughout the area.

Assistant Editor Ted Wett made a trip to Ambler, talked with Plant Manager Graham Smith (shown) and in next month's Ideas section tells how the system has helped speed communications for American.



Remarkable **PLASTISOL** ...improves so many products  
it's an industry itself!

So versatile is plastisol (Exon 654 in the Firestone line of vinyl resins) that its uses are spreading rapidly throughout industry.

All kinds of products are being made better to sell better, with the benefits of plastisol compounds made with Exon 654.

Look at the picture above—plastisol at work! *Slush molded* of Exon 654, the doll acquires a natural look and feel, a washable skin. The supermarket wagon is *dipcoated* with Exon 654 so moisture can't rust it. Exon 654 plastisol coating makes the handbag fabric more durable, colorful, fashionable. Greases can't affect the Exon 654-coated dish drainer.

Even the car itself! It can actually cost less because plastisol reduced production costs! Assembly lines now use grappling hooks to lift the chassis because abrasion-proof plastisol coatings on the hooks prevent marring or scratching the car surface. And the car's battery and other parts were made in a plant that coated its tanks with Exon 654 so that acids wouldn't corrode them.

This remarkable plastisol, Exon 654, is just one of the many resins in industry's most complete line of versatile vinyls. It is another reason why industry looks to Firestone Exon for engineered answers to its needs.

because  
it's made  
of  
**Firestone**



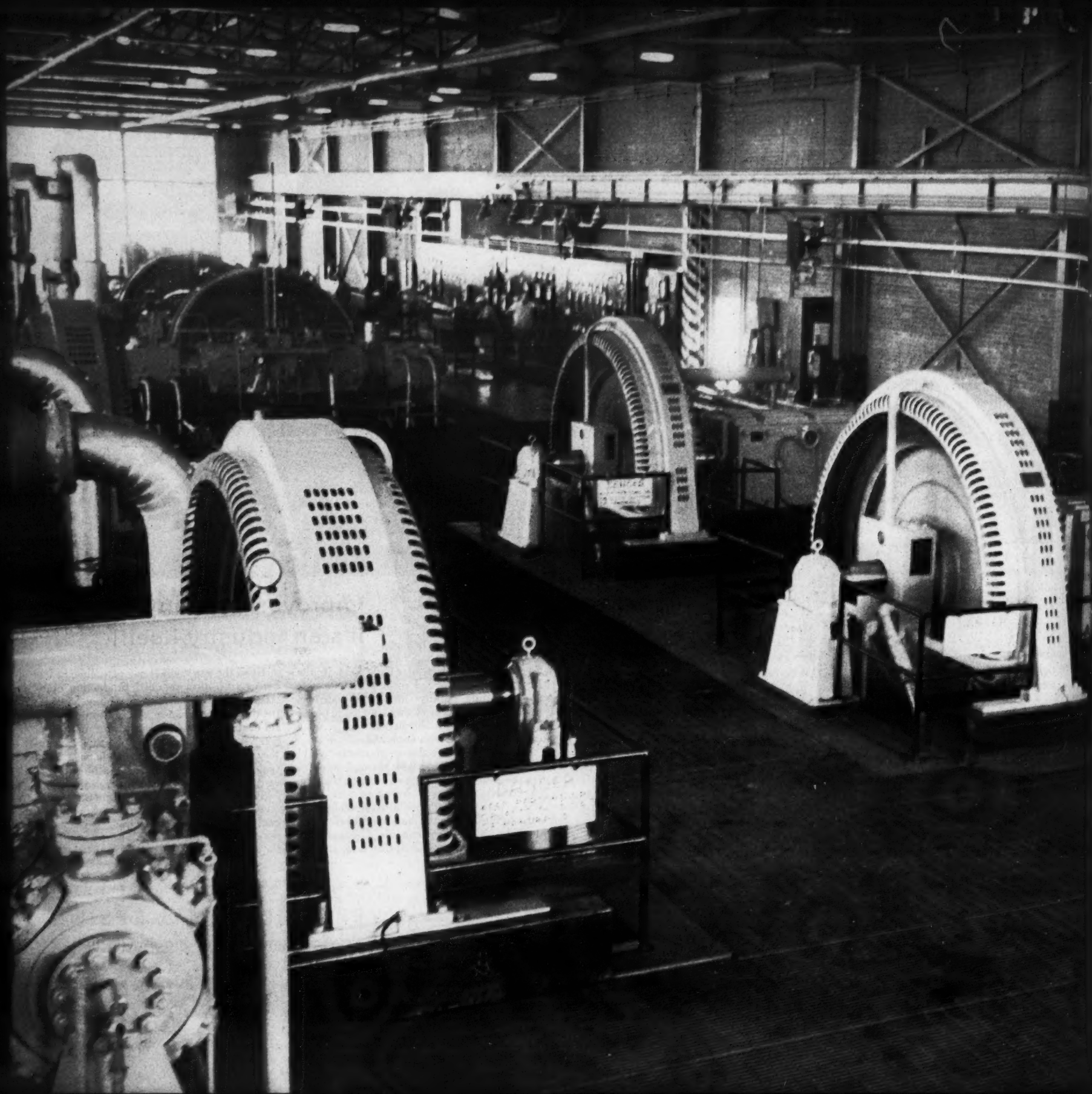
Firestone Plastics Company  
supplies the plastisol  
resin only...does not make  
compounds or finished products.

For complete information or technical service on the entire line of Exon resins, call or write today:  
**CHEMICAL SALES DIVISION**

FIRESTONE PLASTICS CO., DEPT. 68M POTTSTOWN, PA. • A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

**VERSATILE VINYL RESINS**  
engineered answers to industry's needs

When inquiring check 7307 opposite last page





## new solutions of processing problems

Ask any engineer and he'll agree that lubricators can be the "backbone" of your plant. Here's the story behind the development of a unit for high-pressure use. Installed on recirculators at Mississippi Chemical's synthetic ammonia plant, lubricators give trouble-free operation 24 hours a day despite . . .

# lubrication against 1000 atmospheres

TED F. MEINHOLD, Assistant Editor  
With W. B. DUNWOODY, General Operations Manager  
Mississippi Chemical Corporation

**Problem:** When Mississippi Chemical Corporation started up their new nitrogen fertilizer plant in Yazoo City, Mississippi, back in 1951, one of the first difficulties that they encountered involved the lubricators on the ammonia recirculators in their synthetic ammonia (Claude process) plant. Although similar units (bulls-eye sight feed design) were operating successfully on the compressors, the lubricators just wouldn't work satisfactorily on the recirculators. Explanation was quite simple: On the compressors, the pressure in the lubricant line is somewhere between the suction and discharge pressure of the stage being lubricated. On the recirculator, however, the suction pressure is always maximum — in this case 14,000 to 15,000 psi.

The lubricators would develop leaks; cams and shafts would jam or break, and the flow of lubricant to the recirculator's vital working parts would become sporadic and unreliable. Packings on recirculators would last only 3-6 months and then had to be replaced. Lubricators would operate satisfactorily for only a few hours after repairs were made and then would again develop trouble. Frequent shutdowns not only resulted in excessive maintenance,

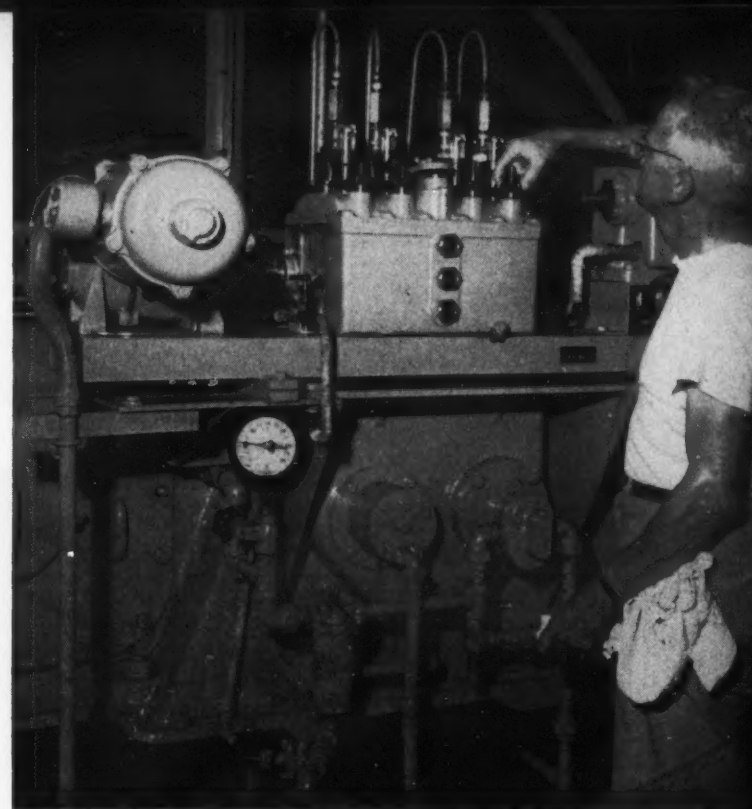
but affected overall plant efficiency.

It should be emphasized that Mississippi Chemical was starting up a type of ammonia plant on which only a limited amount of operating experience was available. A number of departures in equipment and techniques were being utilized. The 1000-atmosphere operating pressure was something that lubricator manufacturers had never really encountered before.

**Solution:** Engineers from both the manufacturer of the recirculators and of the lubricators were called in to see what could be done. Numerous changes were suggested and tried — all with little or no success. It was finally agreed upon that an entirely new — completely redesigned — lubricator would be needed to solve the problem. Mississippi Chemical agreed to cooperate, even though it meant "babying" their recirculators until the new lubricator was developed.

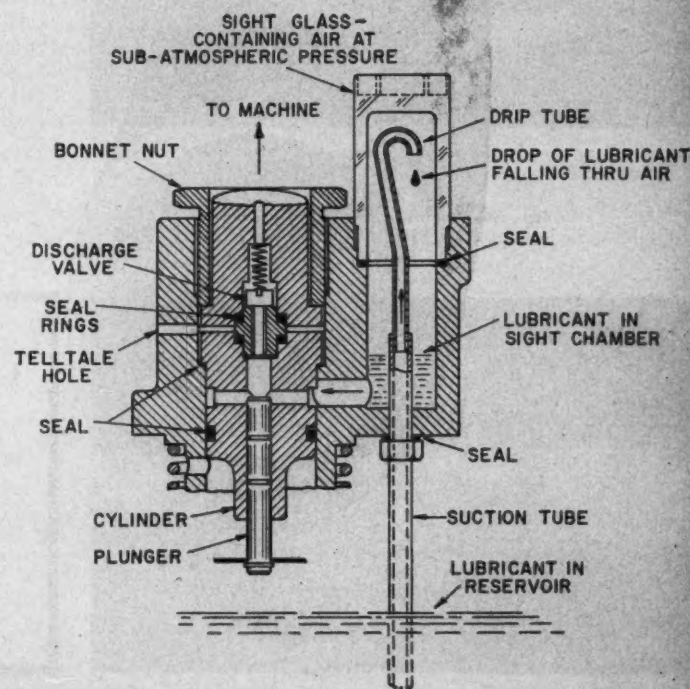
After considerable research and development work, engineers came up with a unit that would do the job. Consisting of four integral sight and pump assemblies mounted on the cover of a cast iron lubricant reservoir, the lubricator is designed for direct connection to a gear motor. Pump assembly is rated at 20,000 psi discharge pressure and has a 5/16" diam plunger. Each assembly will pump about

(Please turn to page 16)



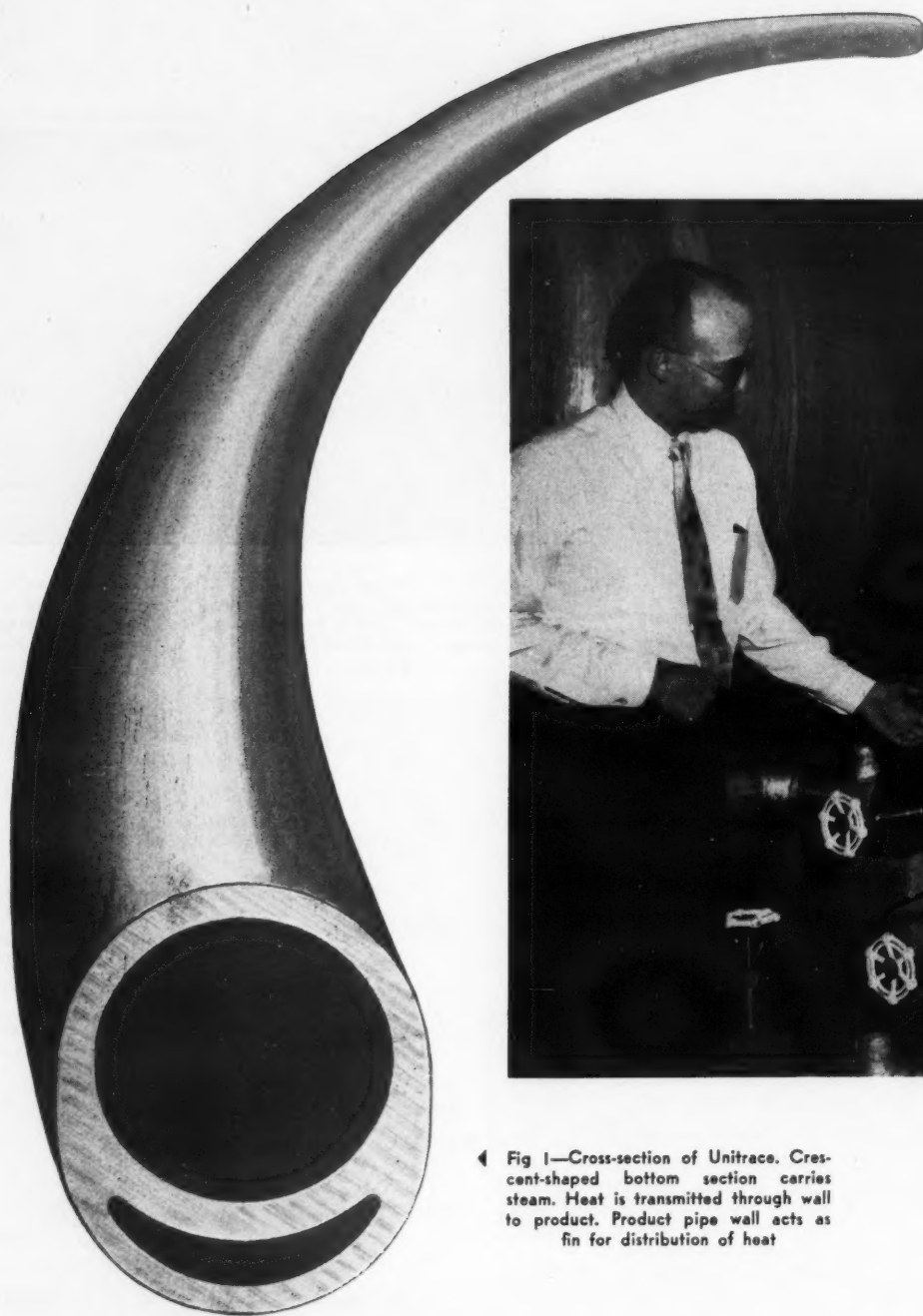
Lubricator consists of four integral sight and pump assemblies mounted on cast iron reservoir. Unit is directly connected to gear motor (left)

Drawing shows vacuum sight and pump portion of high-pressure lubricator. Pump plunger is at bottom of stroke, adjusted for maximum pumping rate



Compressor house at Mississippi Chemical compresses synthesis gas, recirculates ammonia at 14,000-15,000 psi. High-pressure lubricators play important part on this vital equipment

Since rosin solidifies below about 200°F, plant pipe lines that carried it were steam heated so they wouldn't plug. Yet the process required frequent piping rearrangements, so steam jacketing became an expensive way to do it. By using an integral steam-traced aluminum pipe, Hercules Powder Company • • • • •



◀ Fig 1—Cross-section of Unitrace. Crescent-shaped bottom section carries steam. Heat is transmitted through wall to product. Product pipe wall acts as fin for distribution of heat

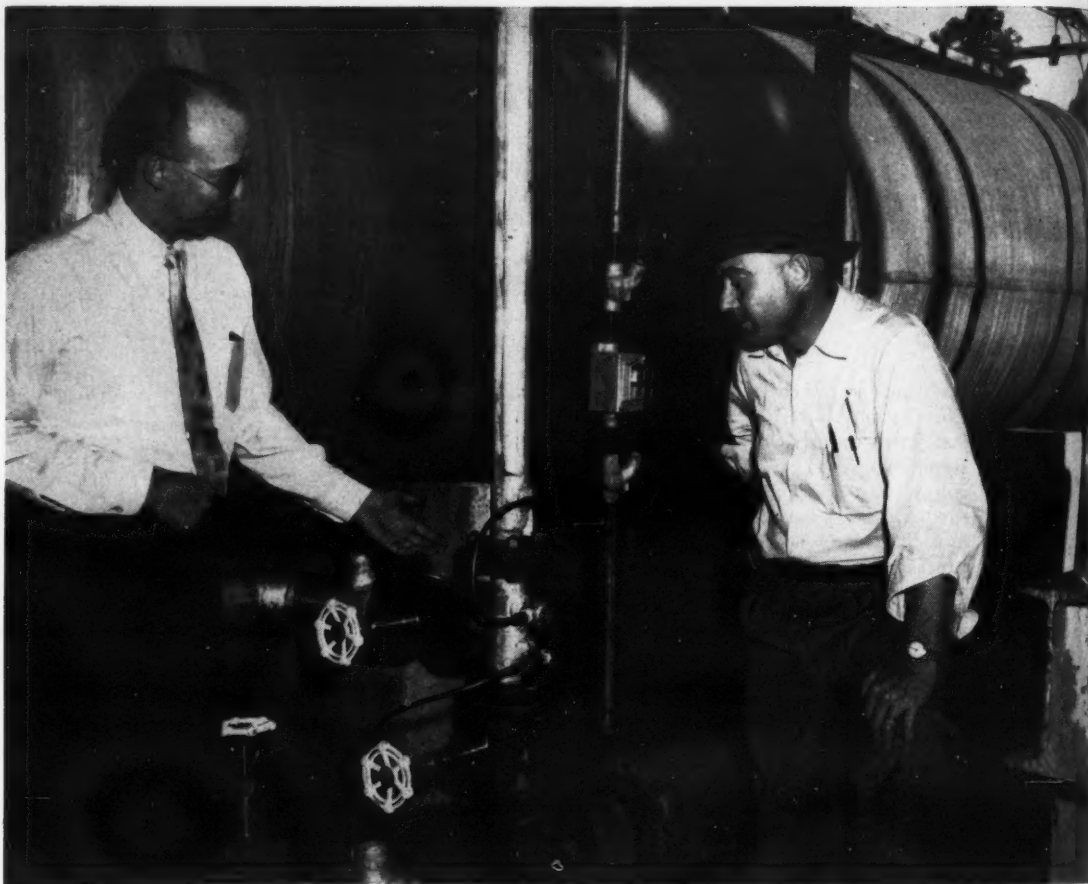


Fig 2—Engineers check a tee and valve setup in rosin line running from aluminum storage tank. Note jumpers for steam line around valves and pump

# CUTS LABOR COSTS FOR PIPING BY 30%

Maintenance crews say they'd rather install this new pipe. In addition to labor savings, material and steam costs are reduced

FRANK E. McELROY, Assistant Editor  
With **ENGINEERING DEPARTMENT**  
Hercules Powder Co.  
Hattiesburg, Mississippi

**Problem:** At their Hattiesburg plant, Hercules produces wood rosin which is further processed in many secondary operations. Process improvements call for frequent piping changes. Since rosin solidifies below about 200°F, rosin lines were steam jacketed and heavily insulated.

Two-inch IPS aluminum pipe was inserted in three-inch aluminum pipe to give a steam channel. (Aluminum pipe is used so rosin won't be discolored.) Steam jacketing involved a heavy investment in both materials and labor. With frequent changes in piping arrangement, this cost was excessively high, and ways of reducing it were sought.

**Solution:** Early in 1953, Hercules engineers got together with engineers of Aluminum Company of America to work out a solution. One suggestion was to group product-carrying pipes around a central steampipe. This was rejected because method would not permit enough flexibility.

A second suggestion was to run both steam and

product lines through a single extruded unit. Except for small modifications to aid extrusion, the original design is still used. Called Unitrace®, design embodies a 2-inch pipe with an integral crescent-shaped steam channel (See Fig 1). The common product/pipe wall transmits heat to the product, while the balance of the pipe wall acts as a fin in distributing the heat around the circumference of the pipe. Although shape of pipe is slightly oval, it can be cold-bent smoothly about any axis, right on the job location and with regular pipe-bending equipment (Fig 4).

For demountable pipe runs, Hercules used flanged joints with "jumpers" to carry steam around flanges and fittings (See Fig 2). Pipe that can be permanently joined was prepared by cutting back the steam channel about two inches from the end of the pipe, and then welding the product sections together (as shown in Fig 5). A "patch" of aluminum was fitted over the cutaway channel's outer wall and then welded to complete the joint.

A third method that has been recently introduced incorporates a very simple flange design. This flange has a built-in product and steam tracing, and requires two gaskets. Fig 3 shows how it works. Flange is made of A356-T6 alloy, and steam-traced pipe is of 3003-F alloy. Weld is made

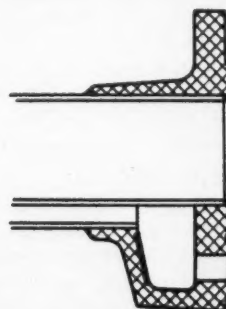
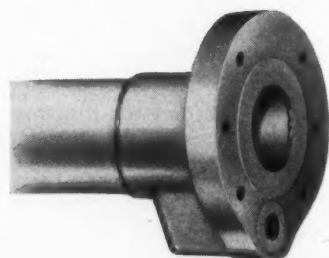
(Please turn to page 18)

Fig 3—Flange design just developed by manufacturer simplifies making easily-broken joints. Trace line is cut back 2½ inches and flange is welded



Fig 4—Maintenance man forms a complex shape in the field with bender

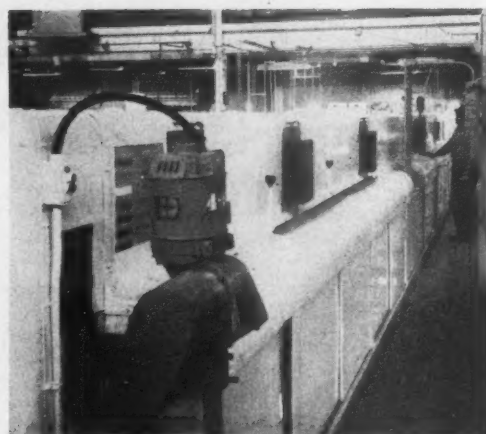
Fig 5—For permanent joint, steam channel has been cut back, product line welded, and then a "patch" welded over the channel







Cooler reduces temperature of air so condensation doesn't form while receiver reduces pulsations and provides air storage



Operator checks one of instruments, actuated by oil-free air, on one of pasteurizers



Air used for blowing off top of bottles or cans after sealing must be oil-free

Time, material, and maintenance labor are saved, production delays eliminated, and high quality of product maintained through use of carbon-ring compressors which furnish —

## OIL-FREE AIR FOR INSTRUMENTS

**GORDON WEYERMULLER**, Associate Editor  
With **GEORGE HUMPHRIES**, Chief Engineer  
The National Brewing Co., Baltimore, Md.

**Problem:** National Brewing Company had trouble with air-actuated instruments plugging up due to oil and condensation in the air. This caused the instruments to record incorrect temperatures and interfered with operations. Production was delayed while instruments were cleaned or repaired.

Instruments consist of about 50 recorders used for regulating the temperature of beer pasteurizers. All instruments are pilot-operated units which control the steam inlet on preheat and precool tanks. It is very important to have closely controlled temperatures in this operation.

Air which actuates the instruments was contaminated by oil used for lubricating the compressors which formerly furnished the air. Also, these old-style compressors delivered the air at a high temperature. This hot air in cold pipes caused condensation which was also bad for the controls.

**Solution:** In Feb. 1955 company placed an oil-free, non-lubricated compressor in service. This unit has an extra long piston rod — to prevent even the most minute contamination of the air by oil. Piston rod is made longer than usual to prevent any portion of rod that enters crankcase from entering cylinder or stuffing box. Oil-baffle ring on piston rod further insures against creeping of oil along rod. Carbon-ring packing is used in stuffing box to eliminate need for oil here. Hence, air side and crankcase are in completely separate compartments. There is no chance for oil to carry over into air side.

Before the air is compressed it passes through a dry-type filter which prevents dirt and harmful impurities from entering compressor. This also prevents undue cylinder wear from foreign matter. After air is compressed in oil-free unit to 100 psi, it passes through aftercooler which reduces the

temperature from 335 to 70°F. Cooling medium is water at an average temperature of 55°F. From aftercoolers, air goes to receiver, which reduces pulsations and provides air storage for peak demand. It also makes provision for settling with a strainer and for automatically draining condensate with a water trap.

In addition to actuating instruments, oil-free air is also used for blowing off the tops of cans and bottles after sealing and for operating automatic unloaders and loaders.

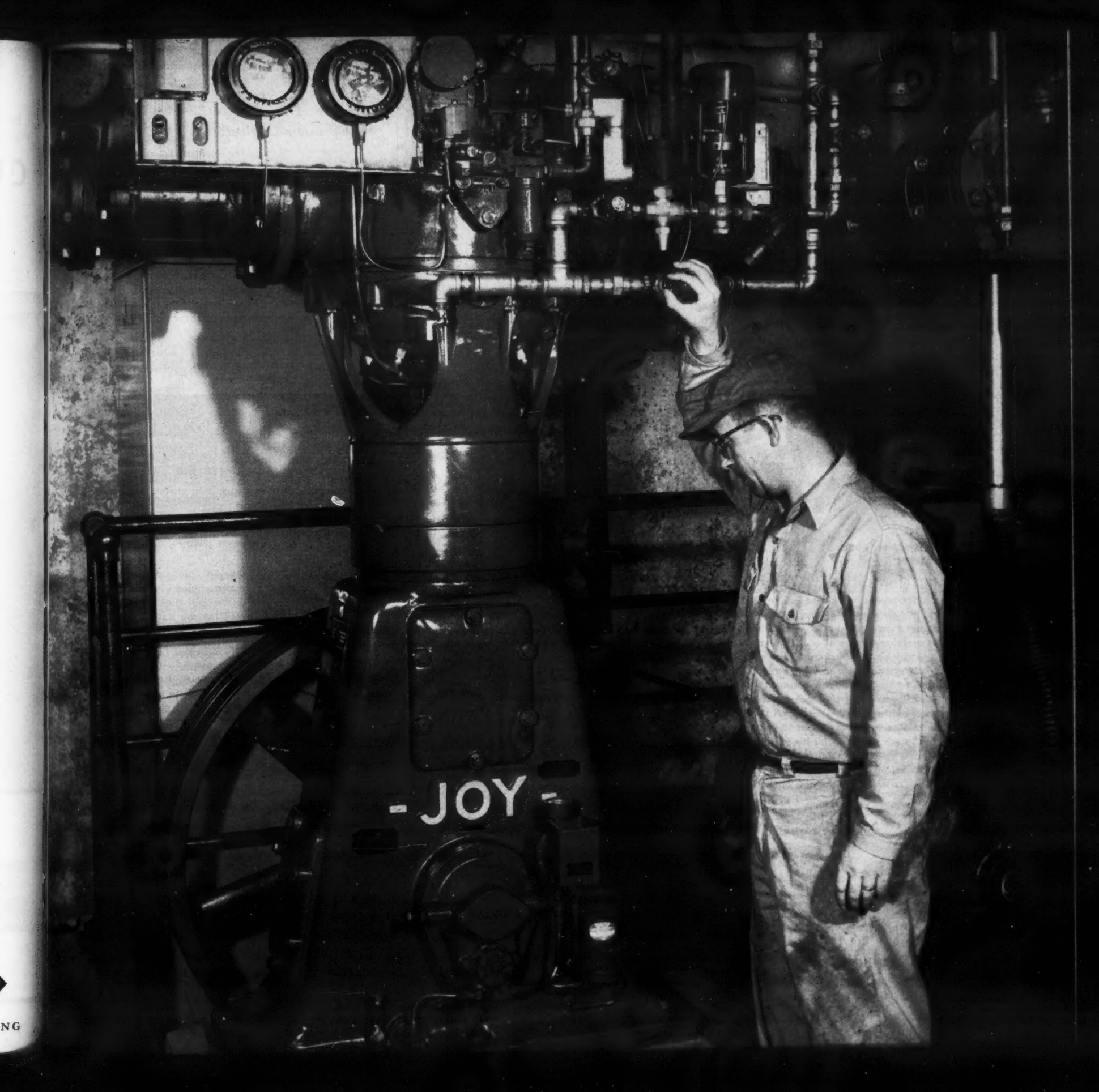
**Results:** Instruments have operated much better with the oil-free air. Time, material, and maintenance labor have been saved on the instruments. Since the air is now furnished at about the same temperature as the pipes, near 70°F, condensation has been eliminated. Maintenance on the compressor equipment has been very low.

Oil-free air has helped achieve the strict control necessary for maintaining the high quality of National Bohemian and National Premium beers. Accurate instrument control is of prime importance in this quality control program. It is also important to not have any oil in the air used for blowing off tops of cans and bottles after sealing. If any oil were present on the top of a can or bottle, it would be extremely dangerous to quality. Another advantage of the present setup is that the air is odor-free, without the burnt smell found in air from some compressors. Odor-free air produced is a result of the use of carbon rings in the compressors.

Results with the first oil-free compressor installation made in Feb. 1955 were so good that a second unit was placed in service in Feb. 1956.

(WGO-9 oil-free compressors, cooler, and receiver are products of Joy Mfg. Co., Dept. CP, Oliver Bldg., Pittsburgh 22, Pa. . . or for more information check 7308 on form which is located opposite last page.)

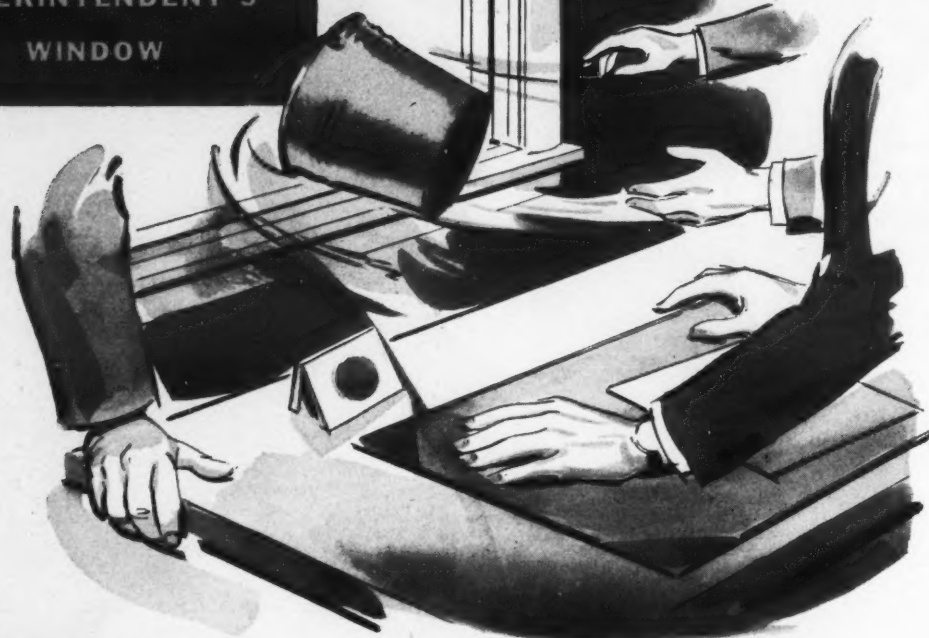
High quality of beer is made possible by this compressor which furnishes oil-free, odor-free air. One end of air cooler is visible at extreme right





HE THREW \$38.50  
RIGHT OUT THE  
SUPERINTENDENT'S  
WINDOW

A short,  
short story—  
reading time  
48 seconds



It might as well have been cash  
— If I know the "super"

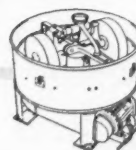
My boss likes to dramatize things. He won his last argument with the superintendent by hitting him where it hurts most . . . in his budget.

We work for a feed manufacturer. I'm a chemist. The boss is mixing foreman. We're blending a small amount of vitamin supplement with bulk feed. That's it—the boss claims we're wasting most of it through improper mixing. The "Super" wouldn't approve his request for a Simpson Mix-Muller—until yesterday, anyway. Seems the boss attended our meeting armed with a bucketful of Vitamin A supplement . . . about \$38.50 worth ("Super" claims it's gold). At the proper time, he told the assembled "brass" that the bucket contained enough vitamin supplement to help fatten a whole herd of cattle—but for all the good it's doing us—and at the rate we're using it, he may as well heave it out the window . . . and he did, bucket and all.

Guess it got their attention for his arguments on how the Mix-Muller is the only mixer specifically designed to give a thorough blend of dissimilar and disproportionate materials. Anyway we ordered the mixer today—and a new bucket.

If you mix dry or semi-solid materials we'd like to show you why and how Simpson Mulling can do a better, faster and truly more thorough blending job. Write for our handbook, "Mulling in the Chemical & Process Industries," today and remember . . .

Mixing and the integration of mixing facilities is our business.



**SIMPSON  
MIX-MULLER  
Division**

**NATIONAL Engineering Company**  
640 Machinery Hall Bldg., Chicago 6, Illinois

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NEW SOLUTIONS of processing problems

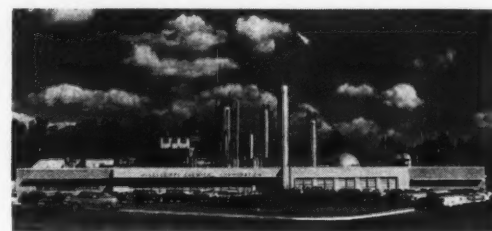
## High-pressure Lubricators

(Continued from page 11)

6½ drops (0.40cc) of SAE 40 oil per stroke against this pressure.

The stroke of the plunger is the same for all rates of pumping. Its position in relation to its actuating mechanism can be adjusted so that it travels a greater or lesser distance above the inlet ports in the cylinder. Pump regulators are graduated to show rate of pumping, which can be varied from zero to maximum. As the displacement of the plunger is constant, oil in excess of that being discharged flows back into sight chamber.

Pump is primed by removing sight glass and partially filling the sight chamber well with lubricant. When pump is started, it pumps lubricant out of



General view of Mississippi Chemical's 275-ton per day ammonia plant

sight well until the absolute pressure in sight chamber has been reduced below atmospheric pressure. The pressure differential thus created becomes just enough to overcome the static, velocity, and friction heads necessary to cause lubricant to flow up suction tube and out of the drip tube.

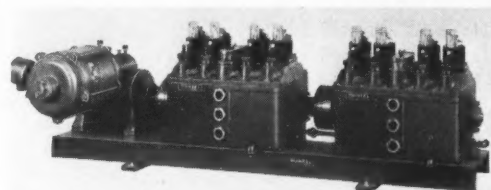
The pressure in the suction ports in the cylinder is the sum of the absolute pressure in the vacuum sight glass plus the static pressure due to the small head of oil in the bottom of sight well. It is less than atmospheric. At the lower end of the cylinder, where plunger enters it, the pressure is greater. It is atmospheric. Consequently, any leakage around plunger due to high pressure will flow back into sight well and at no time will it flow down around the plunger below the cylinder ports and into the reservoir.

Should this high pressure leakage around the plunger occur, the fluid flowing back into sight well will increase the absolute pressure of the air in the vacuum sight. This will reduce the difference between pressure in the sight and the atmospheric pressure in the lubricator reservoir. This reduction in pressure differential will cause the lubricant to flow up through the suction tube and drop out of the drip tube at a lower rate. The new balance in forces acting to cause the lubricant to flow more slowly will be indicated visually by the reduced number of drops falling out to the drip tube. Thus, one can be assured that every drop of



lubricant from the drip tube will be discharged from the pump cylinder towards its destination. There are five seals to prevent the entrance of extraneous air into the suction side of the pump.

One is between the cylinder flange and the pump housing above the cylinder inlet ports. "O" rings seal the cylinder body below the inlet ports and the lower end of the sight glass. An aluminum washer seals the inlet tube where it enters the sight well. The fifth seal is that resulting from the fit of the plunger in the cylinder below the



Lubricators of this type are suitable for 30,000 psi service. Future uses may go as high as 50,000 psi

inlet port. This fit and seal grooves in the plunger body effectively to prevent entrance of air.

**Results:** The new lubricators handle the job 24 hours per day without interruption. Maintenance has been reduced by about 99 percent — units run for well over a year without any maintenance whatsoever. Packings on recirculators now last 12-15 months — instead of the previous 3-6 months. Production shutdowns, due to lubricator troubles, have been eliminated entirely.

Not only did the lubricators solve a difficult problem at Mississippi Chemical, but they have more or less become standard for ammonia plants throughout the US. Used on compressors as well as recirculators, the lubricators have been installed in new polyethylene plants, too. Recent changes have made the units suitable for 30,000 psi service. Future applications could go as high as 50,000 psi.

(High-pressure lubricators are product of Manzel, Division of Houdaille Industries, Inc., Dept. CP, 315 Babcock St., Buffalo 10, N. Y. . . . or for more information check 7310 opposite last page.)

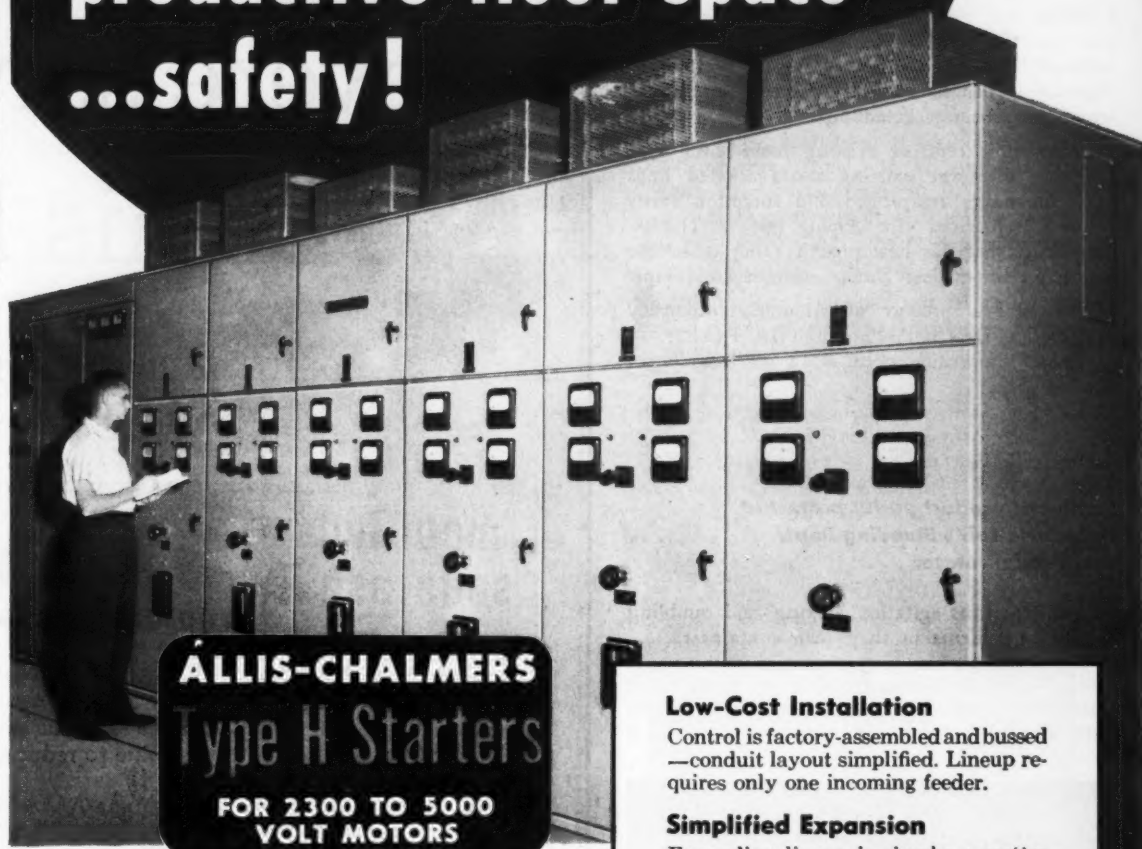
There are sound reasons why . . .

this magazine is "different"!

CHEMICAL PROCESSING'S format, editorial content, and style of presenting articles mean easier, faster reading for you . . . simplify your task of keeping up with the latest developments. Read why on page 100.

You get **MORE** when it's Built by Allis-Chalmers

...more convenience...  
productive floor space  
...safety!



### Centralized Control for an entire plant or department

Time-saving, cost-cutting convenience in planning, buying, installation, and operation are all yours with Allis-Chalmers centralized high voltage control. In addition, the factory-assembled lineup, installed in an out-of-the-way location, releases critical floor space for profitable production. From the safety standpoint, the control operates in cleaner atmosphere and can be isolated from unauthorized personnel when located in a separate control room or area.



For complete information, see your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

# ALLIS-CHALMERS



A-4978

### Low-Cost Installation

Control is factory-assembled and bussed — conduit layout simplified. Lineup requires only one incoming feeder.

### Simplified Expansion

Expanding lineup is simply a matter of adding a starter and connecting the bus. Each starter unit is self-contained.

### Attractive Appearance

Uniformity of cubicles presents modern, streamlined appearance. Concentrating control in one lineup eliminates cluttered look.

### One Company Responsibility

Responsibility for assembling proper devices and for control performance rests with Allis-Chalmers.

When inquiring check 7311 opposite last page

## Unitrace

(Continued from page 13)

using a 1100 or 4043 weld wire.

**Results:** Close cost records show that labor is about 30% lower since switching to Unitrace from steam jacketing. Piping materials and thermal insulation costs have also been cut, since 2-inch Unitrace has smaller diameter than the 3-inch pipe used for steam-jacketing. Two and one-half-inch preformed insulation is used. Weight of Unitrace is also substantially less than equivalent lengths of steam-jacketed pipe.

Hercules now replaces existing rosin lines with Unitrace whenever existing steam-jacketed lines are removed or rearranged. No corrosion exists with the self-traced pipe. Piping crew at Hattiesburg states that this new pipe is easier to handle and looks better than former steam-jacketed pipe.

(Unitrace is a product of Aluminum Company of America, Dept. CP, Pittsburgh 19, Pa. . . . or for more information check 7312 on form opposite last page.)

## Antibiotic product purity protected in Lederle Lab's Blending Dept. using drum rotator . . .

unit permits agitating, mixing, and tumbling of ingredients in their own containers

Uniform, homogeneous blending of Achromycin tetracycline and Aureomycin chlortetracycline, with assured potency and purity of product, is



Stainless steel drum containing powdered antibiotics formulation in position on drum rotator

accomplished at Lederle Laboratories Div., American Cyanamid Co. by utilizing a stationary double drum rotator. Powdered preparations are blended by rotation in stainless steel drums which permit agitating, mixing, and tumbling of ingredients in their own containers. Once antibiotics

# How four tough, diverse chemical packaging jobs were solved with Bemis Bags . . .

## modified soda ash

**problem:** Develop a shipping container with special properties to resist the corrosive action of the contents . . . and to cost less than the rigid containers previously used.



**solution:** A special multiwall paper bag, made by Bemis . . . a sewn valve type with a polyethylene-coated inner sheet . . . that cost only about one-third as much per hundredweight (including filling and closing labor) as the containers previously used. Further savings were made in storage space of both empty and filled containers and in lower shipping costs due to reduced tare weight.

## powdered aluminum

**problem:** The product must be protected against moisture and the shipping container must also be tough enough to stand up in export shipment.



**solution:** Bemis Waterproof (laminated-textile) Bags, which gave the necessary moisture protection and the required durability (they're the toughest shipping bags made). Furthermore, they save the shipper a lot of money, as the bags cost about 40 cents each, as compared with \$1.25 for drums of equal capacity. There is also a substantial saving in empty container storage space.

## polystyrene crystals

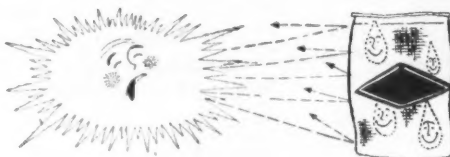
**problem:** Develop a shipping container that will (a) keep the polystyrene crystals entirely free from foreign matter, even down to lint particles, (b) withstand the rigors of export shipment, involving multiple handling, exposure, etc., and (c) cost less than the double-packaging (with overslips) previously used.



**solution:** A special type of laminated-textile valve bag developed by Bemis. The bag is constructed of tough burlap laminated between two types of special paper . . . providing ample strength, resistance to abrasion and freedom from lint. An ingenious method of sewing prevents burlap lint from getting into the polystyrene. Substantial savings are made on every bag shipped, not only on bag cost but also on labor.

## resin beads

**problem:** Find a lower cost, easier handling shipping container for ion exchange resin beads in which the moisture content must be maintained at its original approximate 45%. The material was previously shipped in fiber drums.



**solution:** A Bemis Waterproof (laminated textile) Bag, with a loose poly liner. After being filled, the liner is tie-closed and the burlap bag is closed by sewing. Advantages — Necessary moisture content is retained. Shipping weight is substantially reduced. Bags are more easily handled and require less unloading time. Drum disposal problem is eliminated. There is a storage space saving of 30% on filled bags and an even greater saving in empty container storage space.

Whether your shipping container problems are similar to any of these . . . or far removed from them . . . it's likely that Bemis can help you reach a money-saving solution. Write, wire or phone us. You will soon know whether we can help you.

# Bemis



General Offices—St. Louis 2, Mo.  
Sales Offices in Principal Cities

When inquiring check 7313 opposite last page

## NEW SOLUTIONS of processing problems

are placed in 30 and 55 gallon drums, containers are not opened again, except for quality control testing of batch samples, until final filling of individual bottles and vials.

By performing number of operations without bringing product in contact with any outside source of possible contamination, Lederle is able to maintain consistently rigid standards of potency and purity.

Rotator's running mechanism, four 6" diameter roller-bearing idler wheels mounted on a 3/4" diameter shaft, contribute to uniform, homogeneous blending. Motor can be adjusted to give any fixed drum speed from 5 to 30 rpm. Net weight of drum used varies from 30 to 55 kilograms. Four of eight neoprene drive wheels on each rotating unit hold drum ribs to prevent creeping.

A rubber-roller attachment, developed by Lederle because stainless drums do not have protruding rings, is placed against end of drum to keep it in position. Unit has capacity for loads up to 2000 lb.

(Model 2-5154 stationary double drum rotator was supplied by Morse Manufacturing Co., Inc., Dept. CP, East Syracuse, N.Y. . . . or for more information reader may simply check 7314 on the convenient Reader Service slip which is located opposite last page.)



### No opening for me here

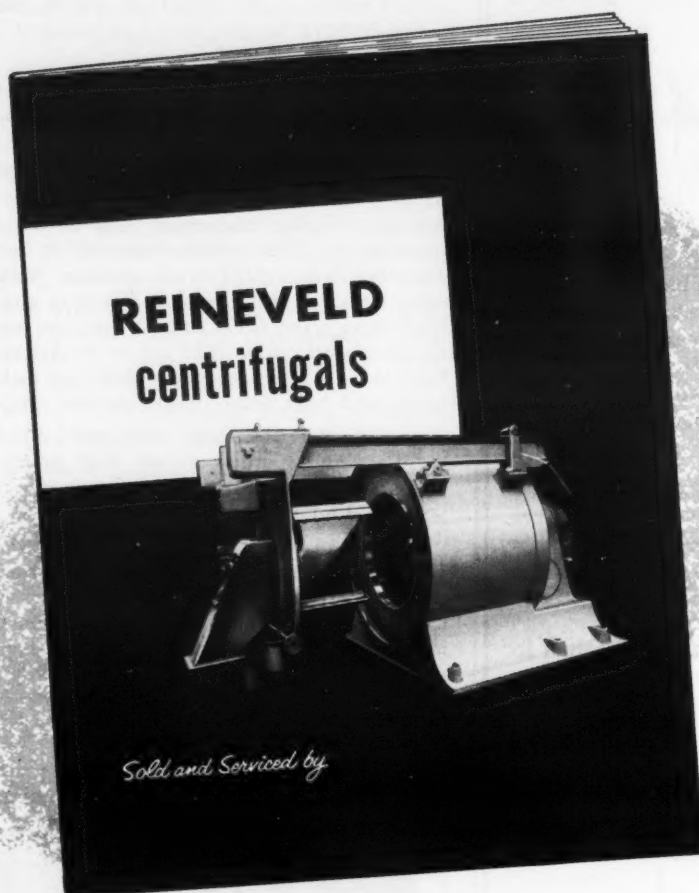
This mouse will have to find a new home. His old one, the nice warm confines of electric motors used in oil field operations, has been eliminated.

Anti-rodent screens have frustrated his efforts to climb into operating motors—a practice which did neither mouse nor motor any good.

For more information contact Medium Induction Motor Dept., General Electric Co., Dept. CP, Schenectady 5, N. Y. . . . or check 7315 on form opposite last page.



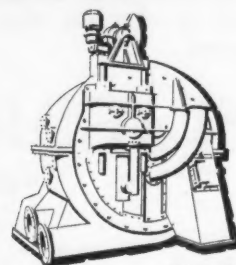
# For the Engineer's File...



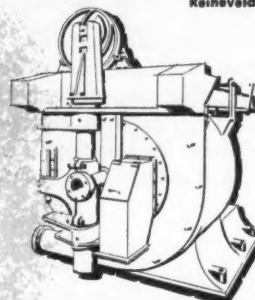
Upon request Heyl & Patterson will send you a new brochure illustrating and describing Reineveld Centrifugals. It is replete with tables and a wealth of design and operating data.

Something new has been added . . . interesting news about the new *Reineveld Continuous Centriplanes* . . . which have capacities from 3 to 10 tons per hour.

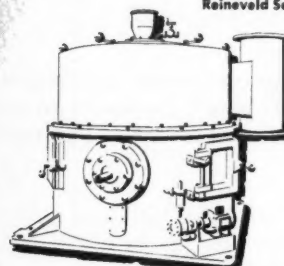
Write or phone today for H & P Brochure RC-356. It deserves a visible and reachable place in your technical file.



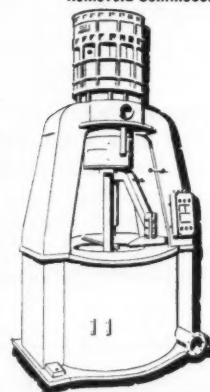
Reineveld Centrifuge



Reineveld Separator



Reineveld Continuous Centriplane



Reineveld Vertical Centrifugal



55 FORT PITT BLVD. • PITTSBURGH 22, PA.  
PHONE COURT 1-0750

When inquiring check 7316 opposite last page

## NEW SOLUTIONS of processing problems

**Test results on relative turbidity show definite relationship to relative purity . . .**

employ nephelometer as practical means of measuring turbidity of sugar solutions

Using a nephelometer, Refined Syrups and Sugars, Inc., of Yonkers, N. Y., has found there is a distinct pattern in relative turbidity values and relative purity of sugar solutions. Company began study of turbidity to detect and evaluate trace amounts of impurities. Turbidity in refined sugar solutions indicates presence of substances so finely dispersed as to be undetectable by an unaided eye. Suspensions are so extremely dilute that solutions appear crystal-clear with transmitted light. Faint haze is only detectable when looking across a strong beam of light passing through the solution.



Operator reads measurement of turbidity directly

Undetectable by microscopic examination, particles causing turbidity cannot even be detected with a spectrophotometer measuring per cent transmittancy of a beam of light. Turbidity can be detected and measured with light scattering photometer, but the instrument is not readily adaptable for routine control work. Operation requires trained technician for making readings and calculations.

Use of nepho-colorimeter required no calculations. Standards were previously prepared stable suspensions, adjusted to cover region from absolute clarity to zone of turbidity in five steps. Using percentage distribution of nephelos readings, statistical data showed significant relationship of relative turbidity and relative purity.

Definite pattern of turbidity values was observed by Refined Syrups & Sugars, Inc. according to combination of processes used in refining. Ion exchange, vegetable carbon filtration, bone char treatment were all used to reduce turbidity. Lowest nephelos reading was secured from sugar solutions refined with all three.

(Nepho-colorimeter is product of Coleman Instruments, Inc., Dept. CP, 318 Madison St., Maywood, Ill. Check 7317 opposite last page.)



Trends . . . John C. Vaaler and Bruce Fader  
discuss the significance of current happenings in . . .

# Chemical Business

Keep informed — you, as a member of chemical industry's management, must keep tabs on the trends and happenings in your work. CHEMICAL BUSINESS, a regular section of CHEMICAL PROCESSING, has been designed to help you.

## Washington Rumbles

**Competition** was the key word in hearings before the Antitrust and Monopoly group of the Senate Judiciary Committee as legal aid **Henry H. Fowler** of the Manufacturing Chemists' Association testified about bill S.11. The Senate's S.11 would amend the Robinson-Patman Act to prevent "price discrimination" between customers. (The House has one (H.R.1840) similar to S.11 on the fire.)

Substance of Fowler's stand: Such legislation may be needed at the wholesale and retail level, but at the manufacturing level in chemicals its effects would not be healthy. After all, isn't price discrimination one of the **modus operandis** of competition? Certainly a price break to one company spurs that company's competitors to get the same break . . . and urges lower prices onto the seller's competition.

While MCA recognizes the "laudable purpose of S.11," he said, it hopes that congress will not pass a law "which will bring about a state of confusion whereby the best intentioned of chemical manufacturers must merely guess whether they can use the good faith meeting of a lower price as a competitive tool without being in violation of the law."

Pointed out Fowler, "there are few of the almost 8000 chemicals produced in the U.S. that cannot be made from alternate raw materials and by different processes. Research in chemical industry is a built-in guarantee of competition."

## Six months' earnings

. . . of chemical companies, now being reported, continue at record levels of 1955 with many companies hitting new highs. Sales and earnings continue, in most cases, to reflect general business conditions caused by higher consumer incomes and heavy business investment. A few companies are showing lower net earnings per share.

Summary of six-month earnings reported as **Chemical Business** went to press:

Company	Earnings per Common Share	
	1956	1955
Chas. Pfizer	1.77	1.58
Commercial Solvents	.60	.60
National Distillers	1.08	.69
Stauffer Chemical	2.17	2.00
Phillips Petroleum	1.50	1.40
Am. Potash & Chem.	1.39	1.18
Air Reduction	2.21	1.60
Pittsburgh Coke & Chem.	1.54	1.51
Diamond Alkali	1.12	.67
Corning Glass Works	1.39	1.43
National Lead	2.45	1.97
Shell Oil	2.52	1.98

## Starting salaries

. . . followed the same old trend for engineers last June. Still "spiraling," was the word from Illinois Institute of Technology's busy placement director, **Earl C. Kubicek**.

The engineer under the mortarboard this year looked forward to \$391 a month . . . last June's grad, to \$383. Says Kubicek, "The average starting salary [for engineers] has increased every year since 1938 . . . over \$100 since 1949."

Top dogs among the brand-new grads: electrical engineers with a \$461 average price tag. Not far behind: ChE's at \$424.

With the technical manpower pinch becoming more real every month, Kubicek scored one more telling point. Job interviews per engineering graduate have risen from six to eight, on an average, he said.

## Expanding its phosphorous operation

. . . Victor Chemical has approved plans for construction of an additional 35,000 kw electric furnace for production of elemental phosphorous at the company's Mt. Pleasant, Tenn., plant.

Making a total of five furnaces at the plant, unit is expected to go on stream during the last half of 1957.

(Continued from preceding page)

#### Titanium dioxide results

... at the new Adrian Joyce plant in Baltimore has caused Glidden Company to plan accelerated expansion that will quadruple capacity by 1957 instead of 1960, as originally planned. "Highly successful results to date," were the words used by folksy Glidden prexy **Dwight Joyce**.

Behind the decision to whack three years out of Glidden's timetable: A change in purchasing policies which date back 15 years. Less than a fourth of the titanium dioxide Glidden uses in paints has come from its own plants. The company has shopped among all the major producers — National Lead, DuPont, American Cyanamid, New Jersey Zinc. Completion of the project will mark the end of Glidden's dependence on outside suppliers — though a hefty \$30 million capital investment is required.

One factor in this king-size expansion: increasing use of the white pigment in paint. Trend to one-coat repaint jobs has meant jacking  $\text{TiO}_2$  content above the norm (about 1.6 pounds per gallon). And do-it-yourself alkyd and latex interior paints are running about 15 to 20% titanium dioxide by weight.

#### Crystal balling

... into futures for "Lucite" and other acrylic resin products has caused both DuPont and Hercules Powder Company (with Imperial Chemicals of England) to expand and build production units for methyl methacrylate. DuPont has already started its expansion at the Belle Works, near Charleston, W. Va., and completion is expected within two years. Hercules, with Imperial Chemical Industries Ltd., will build an \$11 million plant at Louisiana, Missouri, with an annual capacity of 35 million pounds. Ownership of the new corporation formed to build and operate the plant will be 50-50.

## Our Growing Industry

### Another Go at Gilsonite

Next spring a relative newcomer to the chemical scene, American Gilsonite Company (it's a joint affiliate of Barber Oil, Standard of California), will have another go at doing something with Gilsonite. A solid, black, resinous hydrocarbon, Gilsonite was named for Sam Gilson, the sourdough who found it seventy years ago. There have been plenty of chemical claims on the material since then (asphalt tile, inks, paint, battery cases), but not much paydirt.

With an estimated \$16 million-plus grubstake, American Gilsonite is working this claim in a substantial way. Plans call for producing electrode coke (it takes a pound of this special coke to make three pounds of aluminum) and "high octane" gas. Oil people are tending to look at this as a glorified research project. But it stands to reason that like Carbide's \$17 million coal hydrogenation plant, the Gilsonite project will have to go a long way toward paying for itself.

Already invested in the scheme: about \$1 million — spent learning how to treat the ore. Current expenses are to cover 1) new mining equipment and techniques ("wet" mining) at Bonanza, Utah, 2) 71 miles of six-inch pipeline over rough and rocky terrain (maximum elevation of the line — 8492 feet) to carry 600 tons a day of Gilsonite (in water slurry) to 3) a plant near Grand Junction. (Plant is described on page 98)

**Electrode coke** may be the more substantial of the two products. Yields of green coke will run about 50% — though there will probably be some shrinkage in calcining to produce the finished electrode material. Bear in mind that the Grand Junction plant is strategically close to the power-lot Northwest ... where aluminum is booming.

**Gasoline** — pegged as unleaded 86 octane in pilot work — will make up about 35% of the yield. Chances are that the Colorado-Utah area will easily soak up about 1300 bpd which the refinery figures to produce. Hints Gilsonite **president Goodner**, gasoline output of the plant will be far-and-away ahead of local competitors in quality. Chemical market people can scratch their heads and wonder how far this will stretch the rule-of-thumb 300 mile economical radius for tankcar gasoline.

Not all dark horses are in the presidential race. What the Gilsonite reserves (figured as 50 to 100 years' supply) mean is open to speculation. But this much is sure, Gilsonite is hitched to going, and growing, aluminum. It is also a neat hedge to that periodic spectre of disappearing oil reserves — which shouldn't make Barber or Standard of California mad.

#### B<sub>12</sub>: From 6000 tons — 25 pounds

It takes 72,000 tons of Milorganite to produce 200 to 250 pounds of pure vitamin B<sub>12</sub> ... valued at approximately \$245 per gram. But only 6000 tons of the dried sewage sludge will be processed annually at the Milwaukee Sewage Commission plant after completion of new unit late this summer. Although effective against pernicious anemia, vitamin B<sub>12</sub> will be used only in concentrate form to fortify animal and poultry feeds as a growth stimulant. B<sub>12</sub> for human consumption, an attractive possibility, awaits approval by the Food and Drug Administration.

Expected yearly production of the pure vitamin: from 6000 tons of sludge — 25 pounds of the pure vitamin. Dollar value: \$2.75 million.

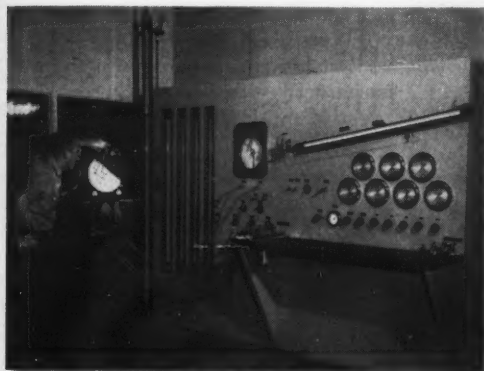
(Chemical Business continues on page 119)



**With instrument testing panel,  
flowmeter calibrated in 1/10  
previous time . . .**

Monsanto uses setup for assuring accuracy of 1000 instruments in Everett plant

An instrument testing panel in use at the Everett, Mass., plant of Monsanto is of great value in assuring the accuracy of the more than 1000 instruments in use in the plant while cutting checking and cali-



Instrument testing panel in operation at Monsanto

brating time. For example, a flowmeter can be calibrated in about 1/10 the time formerly required through use of the panel. While it previously took 2 1/2 hr, only about 15 minutes now is needed to check the accuracy of this instrument. Testing panel provides total labor savings in plant of approximately \$5000 per year.

Reason for the time saving is that setup time is eliminated. Heads established on panel are automatically maintained. Instrument panel consists of manometers of various sizes arranged so that different combinations can be switched in quickly. Pressure control section of board has an air pump which permits pressures from 100 to 3000 psi to be developed.

For low pressure work, a sloping manometer is used, range 0 to 8" water, with an air transfer switch connected so that instrument can be used on pressure or vacuum. Pressure or vacuum is established with a pressure-vacuum variator.

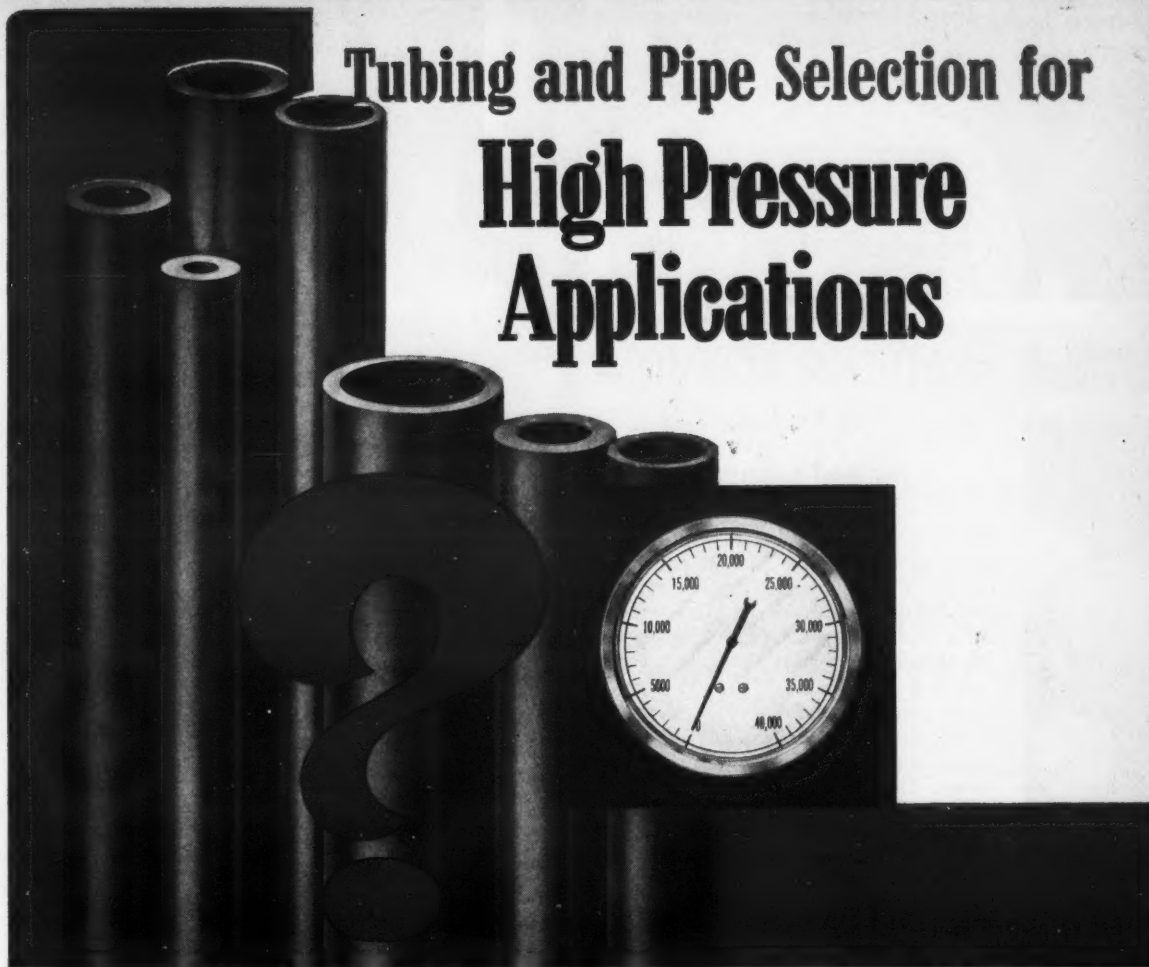
Instrument panel gives a fast method of testing flowmeters, pressure devices, vacuum devices, and other instruments. It was placed in service in the Monsanto instrument shop about two years ago.

(For more information on pressure-vacuum variator check 7318 on form opposite last page.)

This month's Processing and Engineering

Data section starts on page 76

# Tubing and Pipe Selection for High Pressure Applications



Specific working pressure is one of the major considerations in the choice of tubing or pipe for a given fluid-handling application. To obtain optimum efficiency and economy, however, it is necessary to consider temperature conditions, tube size, mechanical strength of the steel, and corrosion hazards.

A case in point that clearly shows the complexity of selecting the right tubing for pressure applications involved the installation of a stabilized stainless steel to carry methanol and unreacted synthesis gases at 300 F and 5000 psi while being exposed to chloride-bearing bayou water. This exposure caused pitting corrosion which, in turn, localized the pressure stresses at the roots of the pits causing, eventually, failure by stress corrosion. To effectively solve this costly problem, B&W with its long experience in all phases of tubing applications, helped in selection of B&W Croloy 5. This choice provided increased resistance to the pitting while meeting the temperature and pressure factors satisfactorily and at a substantial savings in material cost.

It takes an expert to specify the optimum tubing or pipe for any particular application. And there is no substitute for the kind of experience with such problems that you will find at B&W. To get the most benefit from B&W's long experience in matching tubes and piping to jobs — call on Mr. Tubes, your nearby B&W Tube Representative. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



TA-5058-4

Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

When inquiring check 7319 opposite last page

Prevent catalyst  
contamination...with  
**ALCOA**  
**TABULAR ALUMINA**  
**BALLS**  
for bed supports  
or covers

Prevent catalyst contamination problems! Use ALCOA® Tabular Alumina Balls for bed supports or covers. Neutral, nonreactive and highly refractory, they keep contamination negligible.

ALCOA Tabular Alumina Balls are high purity alumina in the sintered corundum form. Their chemical analysis is better than 99.5%  $Al_2O_3$ . Their softening point is well above 3500°F. . . and they are unaffected by oxidizing or reducing atmospheres at temperatures below their softening point. They are practically insoluble in all aqueous and alkaline solutions.

ALCOA Tabular Alumina Balls T-162 are available in 1/4 inch, 3/8 inch, 1/2 inch and 3/4 inch diameters for use as catalyst and desiccant bed supports or covers where exposed to high temperatures, severe corrosive or erosive conditions. ALCOA Tabular Alumina Balls T-164 available in 1/4 inch and 3/8 inch diameters offer greater resistance to thermal and mechanical shock. They are suitable for pebble heaters and similar severe operations requiring high heat capacity and conductivity.

For more information and samples, write ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 705-J Alcoa Building, Pittsburgh 19, Pennsylvania.

 **THE ALCOA HOUR**  
TELEVISION'S FINEST LIVE DRAMA  
ALTERNATE SUNDAY EVENINGS



MEAN SPECIFIC HEAT  
(Btu/lb/°F)

74°F. to 212°F.	0.200
74°F. to 932°F.	0.233
74°F. to 1832°F.	0.244

BALL SIZES AND WEIGHTS

Nominal size, inch	Passes screen opening, inch	Retained on screen opening, inch	Approx. Balls per pound	Approx. Pounds per cu. ft.
1/4	0.371	0.263	670	128
3/8	0.525	0.371	202	126
1/2	0.624	0.525	72	125
3/4	0.883	0.742	27	125

NEW SOLUTIONS of processing problems

**Chemical dehumidifying system  
keeps hygroscopic compound  
from caking . . .**

lithium chloride flood maintains low humidity for National Cash Register Co.

A flood of lithium chloride maintains proper humidity to permit successful processing of a highly hygroscopic compound at National Cash Register Co. This is key portion of chemical dehumidification system used to humidity-condition room where compound is dried, ground, and run through a sieve to obtain flour-like consistency required. Humidity conditioning has automatically, continuously, and economically provided air with exact moisture content found most suitable (80°F, RH 20%).

Use of lithium chloride for chemical dehumidification provides many advantages. Given factors of outside air at 95°F and 130 g/lb, 85°F cooling tower water, and 95°F contact spray temperature, comparison with dehumidification systems using three other chemical compounds is as follows:

	Lithium Chloride	A	B	C
Leaving air g/lb	42.5	61.8	74.7	72
Leaving temp °F	95	95	143	143

With lithium chloride, there is no carryover of solution to create problems with compound used in manufacturing process. As an extra for personnel engaged in work in conditioned room, germicidal properties of solution provide an atmosphere cleared of almost all airborne micro-organisms. Research has shown that more than 97% of such bacteria, fungus spores or other organisms are removed by passage of air through chemical flood.

About 10% of the lithium chloride solution is constantly pumped from a common sump to a regenerator chamber and flooded over steam coils. When solution level rises because of dilution from moisture absorbed, level float opens a valve to admit 25-psig steam to coils. Excess moisture is driven off and vented to outside of building. Regeneration of only this 10% restores absorption capacity of entire supply.

Conventional dehumidification by means of refrigeration, tried previously, had to be shut down during defrosting cycle or standby equipment used to take over during this cycle. It was difficult to economically maintain low relative humidity needed. Experiments were run at an operating temperature of 120°F. Processing was successful but temperature was too high for operator comfort or efficiency.

In present system, entering air varies from 0°F and 1 g/lb in winter to 95°F and 120 g/lb in summer. It is filtered, preheated to 80°F when necessary, passed through chemical flood, and leaves at 72°F, 24 g/lb. Unit delivers 1780 cfm of conditioned fresh air. After-heating and after-cooling coils raise or lower air stream temperature to maintain a dry bulb temperature of 80°F, 20% RH.

(Kathabar chemical humidity system was supplied by

When inquiring check 7320 opposite last page



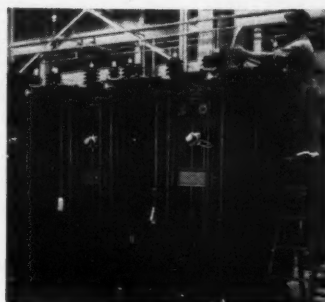
## NEW SOLUTIONS

Surface Combustion Corp., Dept. CP, Toledo 1, Ohio. Check 7321 on form opposite last page.)

(Lithium chloride solution made to specifications exclusively for these dehumidification units is obtained from Lithium Corp. of America, Maywood Chemical Works, and American Potash and Chemical Corp.)

### Mill shutdown cut short by speedy delivery of transformers

Three medium transformers, built in 4½ working days, cut short a costly shutdown at the Stevens Paper Mills, Inc., Westfield, Mass.



Transformers were finished, tested, and shipped 4½ days after order was received

Units were needed when one transformer of the plant's three-phase bank failed. Plant had to slow down to half its capacity and was losing thousands of dollars a day.

Normal manufacturing cycle for the 833-kva single phase units is 7 weeks. Using engineering drawings already prepared, the three transformers were finished, tested, shipped, installed, and operating two weeks after the breakdown.

(Single-phase transformers were produced by General Electric Company, Dept. CP, Schenectady 5, New York . . . or check 7322 on form opposite last page.)

For more information on product at right, specify 7323 . . . see information request blank opposite last page.



Why spend time cutting and fitting small pieces of rigid insulation . . . when you can **WRAP YOUR TANKS WITH EFFICIENT ULTRALITE AND REAP THE SAVINGS?**

## A candid look at a new concept in tank insulation

These photos explain why **ULTRALITE**, the long glass fiber insulation in rolls, is rapidly becoming **THE** insulation for tanks and vessels of all kinds. For "How-to-do-it" specifications and immediate delivery, consult the Yellow Pages under "Gustin-Bacon Insulations" and call your local **ULTRALITE** distributor in any of 67 cities, or . . .

WRITE TODAY FOR TECHNICAL INFORMATION

**GUSTIN-BACON** Manufacturing Company 

210 W. 10th • Kansas City, Mo.

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Molded glass fiber pipe insulation



Lightweight **ULTRALITE** comes in rolls up to **10 FT. WIDE**, in thicknesses up to 6 in., and densities up to 3 lbs. per cubic foot. Thermal efficiency?—Average K factor is .27 at 70° mean temperature.



Whether you run **ULTRALITE** up and down, or round and round, you only need **HALF** as many fasteners to hold **ULTRALITE** firmly in place.



**NO CRACKING** under expansion and contraction, for **ULTRALITE** is flexible and permanent. No expansion joints . . . no pointing up.



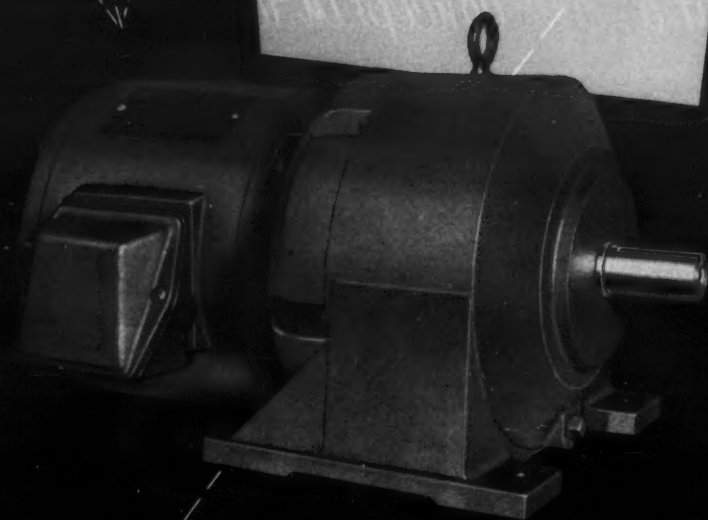
The bigger the tank, the bigger the saving — but don't overlook the economy of **ULTRALITE** on all tanks, vats and vessels!



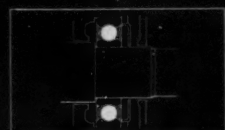
**ULTRALITE** can be weatherproofed with any of the customary materials. On towers wrapped with **ULTRALITE**, weatherproofing materials are often sprayed on reinforcing membranes such as mesh screen and glass fabric.



**Don't  
overlook  
what you  
can't see**



You can't always see what makes a gearmotor outstanding. It's the attention paid to small design details that makes the difference. Here are a few of the details that make the new Reliance Gearmotor stand above the rest.



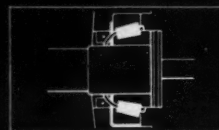
**FOOLPROOF METERMATIC** motor bearing lubrication and oil bath gear lubrication for long-life protection against wear.



**INDUCTION HARDENING** of the tough alloy steel gears gives a perfect combination of wear resistance and strength.



**SIMPLIFIED GEARING** with few moving parts reduces friction losses and lessens chances of breakdown.



**THRUST BEARINGS** handle heavy overhung loads safely by placing strain on the frame instead of the shafts.

Find out the complete story for yourself—contact your Reliance representative or write for Bulletin E-2408.

E-1509

**RELIANCE** ELECTRIC AND ENGINEERING CO.

CLEVELAND 10, OHIO • OFFICES IN PRINCIPAL CITIES

Canadian Division: Welland, Ontario

**REDUCE  
SPEED**

When inquiring check 7324 opposite last page

## NEW SOLUTIONS of processing problems

**Automatically makes changeover from one carbon absorber to another . . .**

program controller helps keep loss of hexane to a minimum

At the Southern Cotton Oil Company, Newport, Ark., a program controller is used in conjunction with two carbon-filled absorbers for keeping hexane losses to a minimum in plant's solvent extraction operation. Controller automatically makes changeover from one absorber to the other on a preset cycle.



CP Staff Photo

Timed-program controller in use at Southern Cotton Oil. With large dial at right direct time settings for cycles can be made, eliminating computation

At the plant cottonseed or soybean material enters a French Oil Machinery Co. horizontal extractor. This material then passes through a train of baskets over miscella (mixture of hexane and vegetable oil). Final wash of pure hexane completely removes oil from the cottonseed or soybean.

On vent end of extractor, hexane vapors (being heavier than air) force air to top of extractor. Though this air is vented through a condenser, some hexane is still present in it. To save this hexane, air is passed to two absorbers — which consist of two carbon-filled Barneby-Cheney pressure tanks, used as collection mediums for reclaiming hexane in discharge vapors.

The timed-program controller, known as a Flex-O-Timer, is used to make an automatic changeover from one carbon absorber tower to the other. This instrument makes vent valve open at a preset time, along with vent air cycle. It also starts and stops induced-draft fan. Instrument also regulates steaming out of tower by purging on reverse cycle.

Controller is currently used on a cycle of about 3 hr-40 min absorbing in each tower. Vapors con-

(Please turn to page 27)

For more information on product advertised at right, specify 7325 . . . see information request blank opposite last page.

CHEMICAL PROCESSING

# STAINLESS STEEL\*



TO MARK PROGRESS



FITTINGS

$\frac{1}{8}$ "

THROUGH

36"

## LADISH

... FOR COMPLETE SERVICE

IN *Controlled Quality* FITTINGS

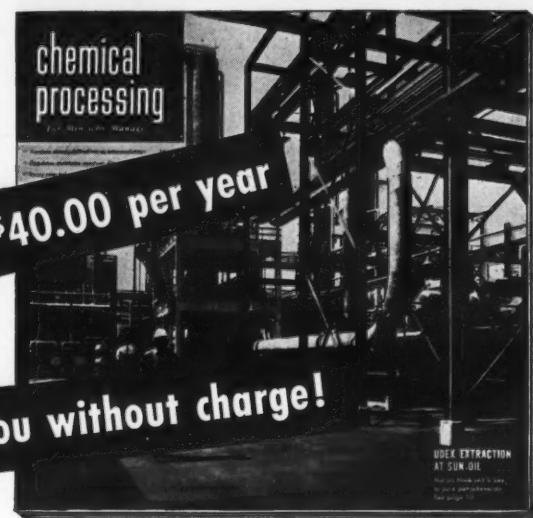
When you need service in stainless and alloy fittings... regardless of material specification, size, type, or wall thickness... you can depend on the Ladish Controlled Quality line and the services of your Ladish Stainless Distributor for complete satisfaction.

IPS WELDING FITTINGS		$\frac{1}{2}$ " through 36" From Sch. 5S to wall thicknesses through 4"
O.D. TUBING FITTINGS		1" through 36" From .049" wall to .250" wall
MSS AND ASA FLANGES		1" through 24" 150 lb. through 2500 lb.
150 LB. SCREWED FITTINGS		$\frac{1}{8}$ " through 4"
FORGED SCREWED AND SOCKET FITTINGS, UNIONS		$\frac{1}{4}$ " through 4" 2000 lb. through 6000 lb.



\*Also furnished in any forgeable material specification including...  
Titanium, Aluminum, Copper, Nickel, and Chromium Base Alloys.

This magazine costs more than \$40.00 per year  
...yet comes to you without charge!



**Why?** Maybe, like many others, you've wondered why CHEMICAL PROCESSING comes to you *without charge* — while, perhaps, you pay a subscription price for other business magazines.

Maybe you've thought publishers *make money* when they sell you a \$3.00 or a \$5.00 subscription.

**No—publishers lose money**... yes, most business magazines lose money when they sell a subscription — not only because the magazine costs more to produce than the subscription price brings in — but also because the cost of making such sales exceeds the income for \$3.00 or \$5.00 subscriptions.

**Advertisers pay the bills** — You see, it's the money that comes from advertising that keeps the business magazine publisher in business. So, logically, such advertisers *demand* best possible coverage of folks like you—the important key men who exercise buying power.

**So—CHEMICAL PROCESSING "hand-picks" best readers**... and sends the magazine to these key folks, without charge.

For you simply can't get maximum coverage of these important folks by trying to sell subscriptions. These men, limited in numbers, are scattered all over

the U.S.A.: travel and/or direct mail cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

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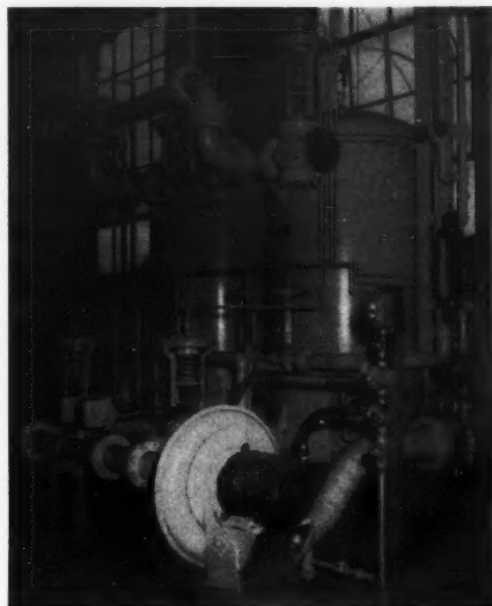
SEPT



(Continued from page 26)

taining hexane are returned to reflux condensers. After removing hexane by steam distilling, remaining gases pass out stack.

Program controller consists of a motor-driven time-measuring device and an independently driven step disc mechanism which controls operation of electrically or pneumatically-operated functions. One of the features of the instrument is provision for direct time settings with a large dial. As a result, operators do not need to make computations, subject to possible error, in setting up cycles.



Controller automatically makes changeover from one carbon absorber to the other, opening vent valves on present time, while starting and stopping induced-draft fan

Time cycles can be set up from a minimum time of three minutes to a maximum of four hours. Time disc automatically resets to zero in 13 seconds or less when timer has completed cycle.

According to N. L. Pugh, Jr., Supt. of the Southern Cotton Oil plant, the instrument has worked quite satisfactorily in the solvent recovery process. Hexane losses have been kept to a minimum. Operator time is not needed to change absorbers.

(Flex-O-Timer is product of Taylor Instrument Companies, Dept. CP, 95 Ames St., Rochester 1, N. Y. . . . or check 7326 opposite last page.)

New Instruments — '55-'56 — page 66

## If You Classify Dry Powders and Want

# Product Recovery of 80% to well over 90%

BULLETIN NO. 1280

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Produced by continuous "flash" distillation  
of Southern pine oleoresin . . .

## HIGHLY REACTIVE RO

*has high purity, is color-stable  
and low in abietic acid*

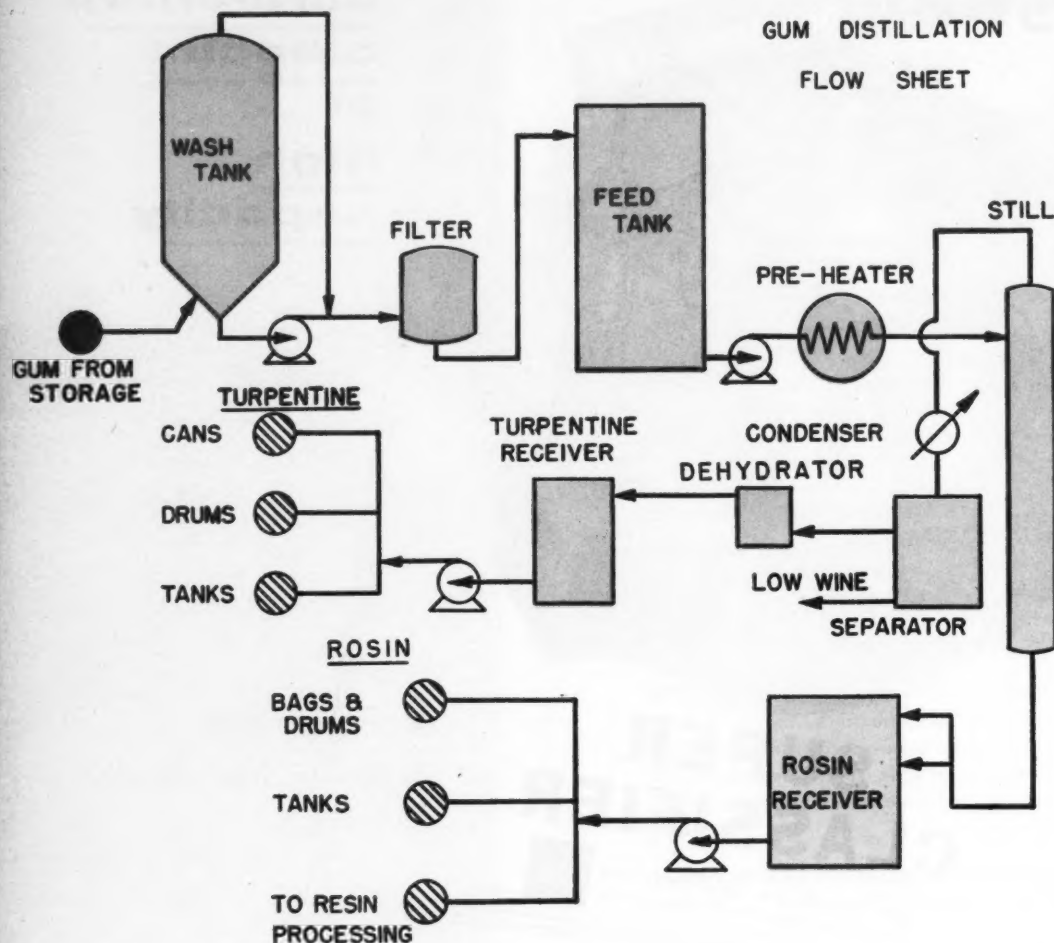


Fig 1—Flow sheet for continuous distillation of pine oleoresin. High-purity rosin and turpentine are yielded in a ratio of about 3:1 (by wt) from the gum

Gum taken from living Southern pines is refined into high-purity, highly reactive rosin that can be used in the paper and in the paint and varnish industries, as well as in linoleum, printing ink, oil and grease, soap, rubber, and adhesives. Used alone or as an intermediate for heat-treated and specialty resins, this rosin is highly reactive. Secret lies in a *continuous* distillation process (See Fig 1).

Requiring only a five minute pass under high heat to separate turpentine and rosin from the gum, rosin is little changed from its natural state. Abietic acid — formed by isomerization of levopimaric acid over long periods of high heat — has little chance to form. Conventional batch distillation of gum requires about a one hour hold under high heat, hence more unwanted abietic acid is formed. Added bonus of the continuous process: color is improved 1 to 2 grades, and more impurities are removed.

### Process Details

Collection of the crude pine gum and its cleaning are handled by manufacturer's affiliate company in the Georgia-Florida area. A standard wooden barrel of the raw gum as it comes from the trees holds 435 lb. Preliminary screening and washing eliminates about 40 to 50 lb of water, wood and bark, pine needles, and insects. Clean gum (pine oleoresin) is loaded on barges and towed up the Atlantic Intercoastal Waterway to company's Fieldsboro plant, located just south of Trenton, N.J. Barge holds 420,000 gal of gum, which is kept liquid by steam-coil heating.

At plant, cleaned gum is stored until ready for processing (Fig 4). First step is a water-wash in a 15,000-gal, Heresite-lined wash tank containing 300 lineal feet of stainless steel heating coils. Water, oxalic acid, and a surface-active agent are added, and the gum is allowed to stand for 12 hr. It is then pumped through a pressure filter to another 15,000-gal, Heresite-lined tank. Process is continuous from this point on.

At a controlled rate, the emulsified gum is pumped from the tank by a stainless steel centrifugal pump. Gum passes through a four-section stainless steel fin tube preheater which raises temperature to 340-350°F by steam in the preheater tubes. Preheater

# IVE ROSIN

sections are 20 ft long. Control is automatic.

From the preheater, gum goes to upper section of the 30-ft distillation column (Fig 2), where it is sprayed downward in a solid cone. At this point, 80% of the turpentine contained in the gum flashes off and passes upward with the steam. About  $\frac{1}{4}$  of gum, as received, is turpentine, rest is rosin.

Liquid gum and remaining turpentine fall downward through a section packed with  $1\frac{1}{2} \times 1\frac{1}{2} \times 1/16$  inch 2S aluminum Raschig rings. Controlled sparge steam, introduced at bottom of still pot, flows upward to strip remaining turpentine.

Turpentine and steam pass upward through the top-packed section of the column, giving partial reflux, to an aluminum shell-and-tube two-pass condenser (Fig 2). Turpentine and water flow into a Monel tank where the water ("low wine") separates by gravity and overflows to the drain, carrying with it caproic, valeric, isobutyric and butyric acids. Turpentine passes through a salt-packed dehydrating tank to a receiver. Clear, low-acid turpentine is continuously pumped to bulk storage. All controls are automatic.

Rosin flows by gravity from the still pot to an aluminum holding tank. Total time of exposure to high temperature has been about five minutes. Rosin is either shipped as a liquid, cooled and packed into drums or bags, or further processed into synthetic resins in one of manufacturer's oil-fired autoclave reactors (Fig 3). In no case, however, does the rosin remain in the holding tank more than eight hours.

A large portion of the production is captive, as manufacturer uses it in making paper size and heat-treated and specialty resins. The distillation unit is completely integrated with the special autoclaves, made by Patterson Foundry and Machine Co.

Development of the continuous distillation process was made by the USDA's Naval Stores Experimental Station at Olustee, Florida. Many of the design details were worked out by manufacturer.

The key to the process — the distillation unit — was designed and constructed by the manufacturer and his affiliate company. Rosin is handled exclusively by Moyno pumps to eliminate turbulent action of centrifugal or gear pumps.

(Rosin and specialty resins are products of Pine Chemicals, Inc., an Affiliate of Filtered Rosin Products, Inc., Dept. CP, Fieldsboro, N.J. . . . or for more information reader may simply check 7328 on the convenient Reader Service slip which is located opposite last page.)

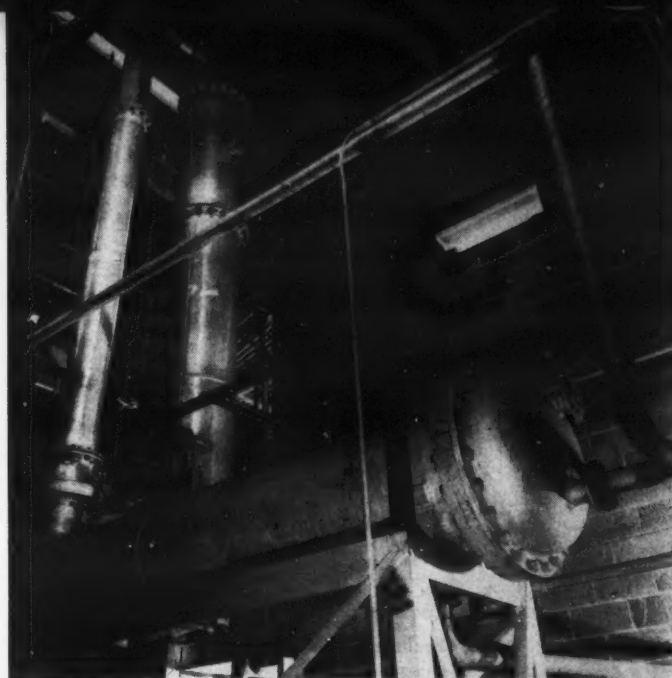


Fig 2—Horizontal unit in foreground is aluminum condenser for turpentine and steam overhead from continuous steam still, which is the vertical column in background. Still is only one of its kind in commercial use in US

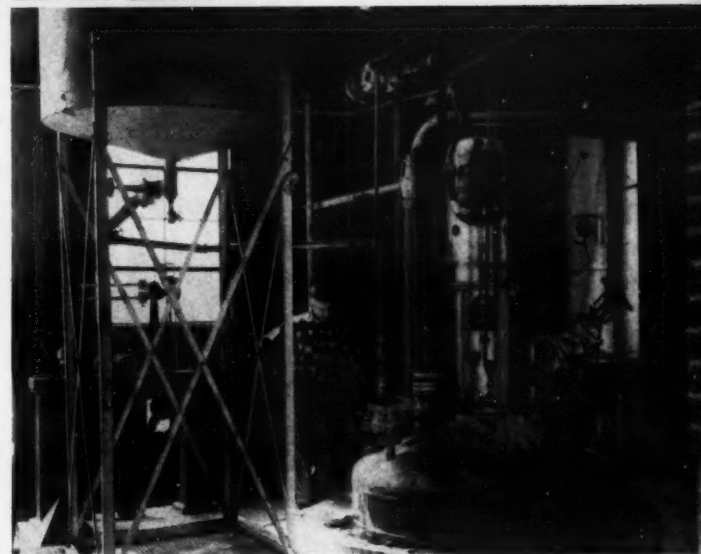
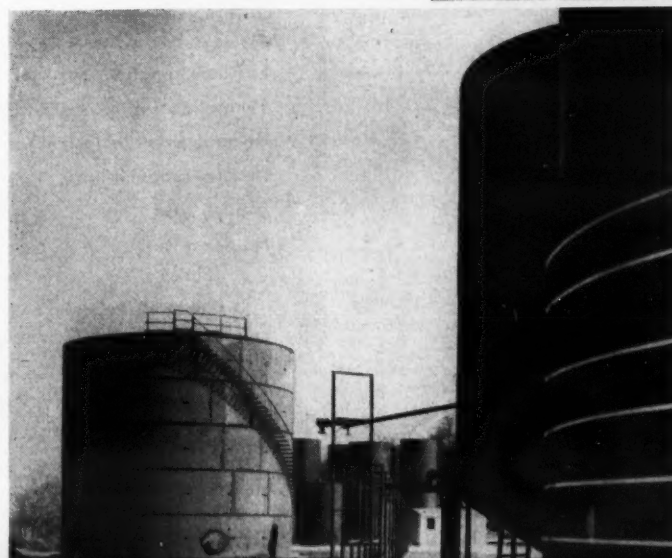


Fig 3—Operator makes specialty resins from rosin in this oil-fired reactor. Weigh tank (left) is for secondary chemicals. Finished hot liquid resin is blown from reactor to packaging area

Fig 4—Pine gum is stored in these iron tanks. With regular shipments of raw gum from the south, capacity is sufficient to store gum for year-round plant operation





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(TV tube,	Tungstic Acid
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## materials

Offers two ready-to-use . . .

## rigid polyvinyl chloride compounds for easy extrusion and calendering

**compound won't build up heat,  
is not nervy on calender  
and is easily post-formed**

**Uses:** Vygen 2201 is exclusively for calendering.

**Features:** Calendered sheets are easily post-formed by deep drawing or vacuum forming. Sheets have high impact strength, high hardness and flexural moduls, excellent weathering properties for a rubber-resin blend, inherent flame resistance, and reasonably good chemical resistance. Material does not have the usual rubbery "nerve" of rubber-resin blends, and has minimum heat build-up during processing.

**Description:** A modified rigid polyvinyl chloride, compound comes ready-to-use, in unpigmented form. It can be pigmented to any color, including white, and can be mixed, calendered,

and embossed easily on existing equipment. Compound is fully stabilized for good color control during processing.

### Processing Notes

This compound is less "nervy" and more fluid during processing than any other commercially-available rigid vinyl compound. Using a 3-A Banbury, mixing time is 3-4 min for a 125# batch, with rotors at slow speed and 50 psi air pressure on ram. Stock temp should be <350°F.

For smooth calendering, stock temp should be 350-360°F. Gradual cooling is recommended, and sheet should come from calender under as little

### TYPICAL PHYSICAL PROPERTIES (using ASTM procedures)

	Vygen 1101	Vygen 2201
Sp gr	1.42 (gray)	1.20 (neutral)
Tensile strength (psi at 77°F)	7000	5800
Elongation (% at yield point)	<5	—
Flexural strength (psi)	12,000	9000
Flexural modulus (psi)	400,000	310,000
Impact (Izod, ft-lb/in notch @ 77°F)	0.8-1.1	5+
Hardness		
(Shore D)	82	—
(Rockwell R Scale)	—	106
Heat distortion point (°F @ 66 psi)	178	183
Water absorption (% wt increase after 30 days @ 77°F)	0.055	0.55

tension as possible to prevent strains which may later cause serious difficulties.

For best results for embossing, stock temp before passing through nip of embossing rolls should be 350°F. Surface temperature of rolls is 150-175°F.

Handling for rigid materials is aided by cutting into sheets by a guillotine arrangement . . . resulting flat sheets may be stacked.

Suggested conditions for vacuum forming are a 950°F temp for the heaters, with distance between heaters and sheet being 6 inches. For sheet that is 0.032 inch thick, heating time is 40-45 seconds. An Auto-Vac forming machine was used.

**Compound for extrusion  
has good chemical resistance,  
high strength, and stability**

**Uses:** Vygen 1101 is a rigid polyvinyl chloride compound, developed exclusively for extrusion.

**Features:** It is ready to use as supplied. Chemical resistance is very high, as is impact strength, tensile strength, and dimensional stability. Heat stability during processing is very good. As it is extruded, compound is firm enough so that it won't collapse under its own weight while "cooling". Extrusions of uniform wall thickness and smooth finish are made easily.

**Description:** Compound is a Type I rigid polyvinyl chloride, without rubber modifiers or plasticizers. Although PVC resists many corrosives, it is not recommended for use with ketones and aromatic hydrocarbons, or for temperatures which exceed 150°F. Physical properties, determined by ASTM test methods, are given in the table.

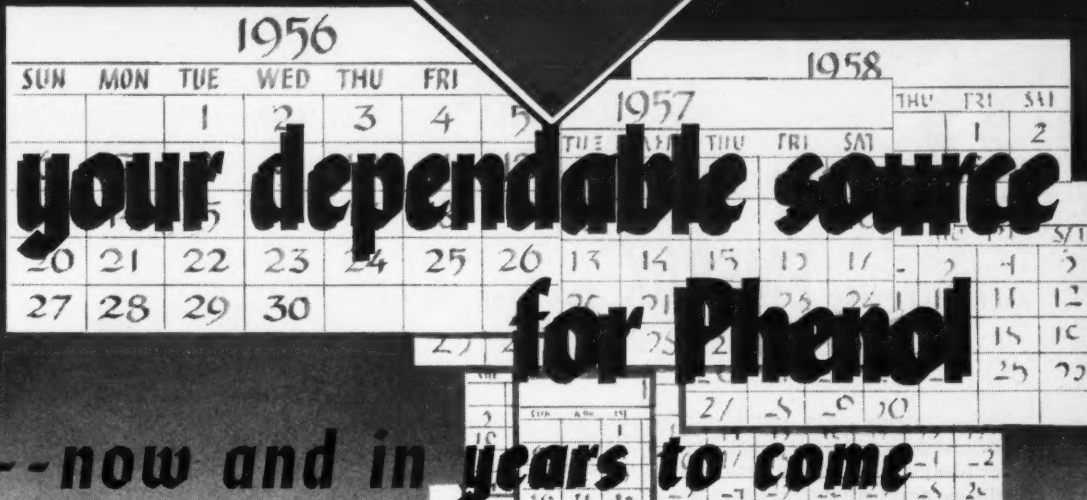
**Processing Notes**

Favorable conditions are given in this example from a run of 2-in sch. 80 IPS pipe. Machine was a Windsor Twin Screw RC-100. A breaker plate and one 20-mesh screen were used. Conditions: Barrel and die adapter temp was 355°F, die and stock coming from die were at 360°F, power was 14 amp, feed rate was 8, and screw speed was 15 rpm.

Best results are obtained when stock emerges from extruder at 350 to 360°F. In no case should temp in any part of extruder exceed 380°F. Die should be as streamlined as possible and should be highly polished and chrome-plated to give plastic a smooth surface.

(Vygen® PVC Compounds are products of Chemical Div., The General Tire & Rubber Co., Dept. CP, 1708 Englewood Ave., Akron 9, Ohio . . . or for more information check 7331 on form opposite last page.)

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## MATERIALS

**A sodium lauryl ether sulfate shows superior properties as specialty detergent...**

forms clear solutions, has high foam level in hard or soft water

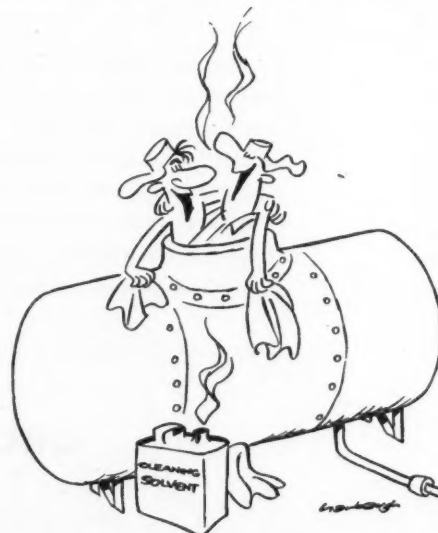
**Uses:** Detergent is recommended as a base for shampoos, cosmetics, and specialty household products. Special industrial applications are also seen, such as in stabilization of latex or resin emulsions.

**Features:** Although similar in appearance to conventional lauryl sulfates, product is substantially superior in that it is soluble in water of any degree of hardness, forming clear solutions. It has a high foam level which is unaffected by water hardness, and has a cloud point about 20° below that of sodium lauryl sulfate, therefore remaining clear and fluid at below-freezing temp.

**Description:** Detergent is a sodium lauryl ether sulfate. A pale yellow, viscous liquid of mild odor, it has these properties:

Alkyl sulfates (%)	30
Free fatty alcohol (%)	<2
Nacl (%)	<1
pH (10% soln)	7.5-8
Cloud point (°C)	-4 to -6
Clarification point (°C)	6 to 8
Viscosity (cps @ 25°C)	<2000

(Sipon ES is a product of American Alcolac Corp., Dept. CP, 3440 Fairfield Rd., Baltimore 26, Md. . . . or for more information check 7334 on form opposite last page.)



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opposite last page

CHEMICAL PROCESSING

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## MATERIALS

**Synthetic rubber  
has new name**



Manufacturer's synthetic rubber now goes by a new name: FR-S. Name replaces GR-S and Butaprene-S names. Liquid latex as well as dry rubber will be identified by this new name.

(FR-S rubber and latices are products of Synthetic Rubber and Latex Div., The Firestone Tire & Rubber Co., Dept. CP, 1200 Firestone Pky., Akron 17, Ohio . . . or check 7336 on form opposite last page.)

### Details destaticizers for polyethylene

Proper method of incorporating manufacturer's destaticizers for polyethylene in various polyethylene formulations is detailed in two-page technical data bulletin. Desirable properties which compounds impart to polyethylene, in addition to antistatic effect, are enumerated.

"Electrosols D, M, and S-1" is issued by Alframine Corp., Dept. CP, 4731 E. 52nd Drive, Los Angeles 22, Calif. Specify 7337 on form opp. last page.

For more information on product at right, specify 7338 . . . see information request blank opposite last page.



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When inquiring check 7339 opposite last page

## MATERIALS

**Cleaning and wetting uses seen  
for anionic surface-active ...**

works well in strong electrolyte solutions

**Uses:** In metal cleaning and hard surface cleaning and as a detergent or wetting agent in textile, leather, petroleum, paper, and food industries.

**Features:** Agent has very high solubility, stability, and surface activity in strong electrolyte solutions.

**Description:** Of the sulfonate type, surface-active agent is anionic. It is a light-colored, free-flowing powder which has about a 93%-active content (by wt). Color of a 10% aq. soln. is 63.2 yellow and 6.7 red (Lovibond 5 1/4 inch column).

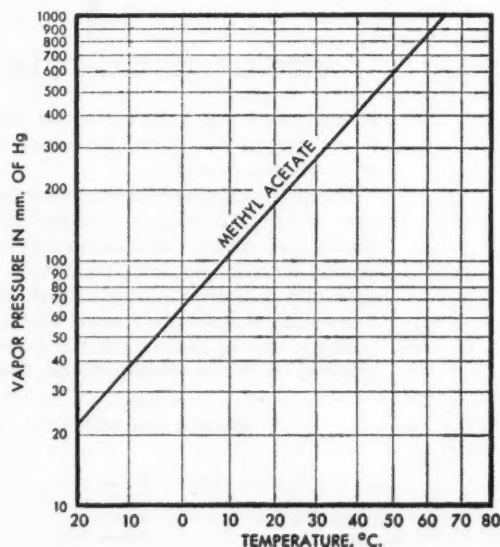
(Dowfax 2A1 is a product of The Dow Chemical Co., Midland, Mich. ... or for more information about manufacturer's product, reader may simply check 7340 on form opposite last page.)

**Chemical intermediate and solvent —  
uses for technical grade  
methyl acetate ...**

highly reactive, compound is also low cost,  
and in stable supply

**Uses:** As a reactive intermediate, methyl acetate is valuable in biochemical and pharmaceutical manufacture and organic synthesis. As a solvent, it is used alone or in combination in coatings, resin compounds, cleaners, thinners, and extractants.

**Features:** Compound is in stable supply because it is a coproduct in production of polyvinyl alcohol. Cost trend is stable and downward.



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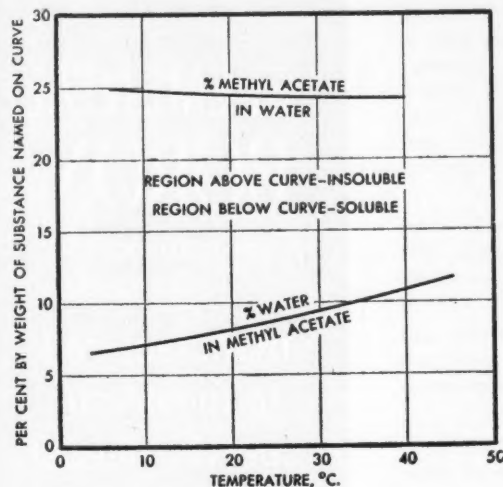
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opposite last page

CHEMICAL PROCESSING

## MATERIALS

In chemical syntheses, methyl acetate serves as a low-cost acetylating agent and an inexpensive replacement for ethyl acetate, other higher esters and acetic anhydride. Compound undergoes all reactions typical of organic esters. It should be especially good in Claisen-type condensations and alkaline hydrolysis.

As a solvent, methyl acetate is fast and has high solvency.



**Description:** Methyl acetate has 95-97% purity. It is a volatile, flammable liquid having a relatively low order of toxicity. Specifications call for 0.1% maximum moisture content and 0.3% maximum aldehydes. Acidity (as acetic acid) is negligible. Vapor pressure/temperature relationship and water solubilities are shown on the graphs.

(Methyl acetate is a product of Polycor-Monomer Dept., Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. . . . or for more information about manufacturer's product, reader may simply check 7342 on form opposite last page.)

### Catalogs over forty pilot plant products

First collective listing of over 40 products which are now available in pilot-scale amounts is given in four-sheet catalog. These compounds include fatty acids; ricinoleate, hydroxystearate, aceto-stearate, undecylenate, epoxy, and miscellaneous esters; metallic soaps; soap solutions; specialties; and synthetic waxes. Properties and suggested applications are given in the tabular listing.

"Catalog of Pilot Plant Products" is issued by The Baker Castor Oil Co., Dept. CP, 120 Broadway, New York 5, N.Y. When inquiring check 7343 on form opposite last page.



This underwater photo dramatically illustrates speedy dispersibility of new Dow Corning Antifoam B.

## NEW

silicone defoamer gives you the ultimate in foam-killing convenience

## ANTIFOAM B

**FAST ACTING** New Dow Corning Antifoam B disperses immediately in aqueous solutions. No stirring or agitation required.

**READY TO USE** Just add "as is" . . . No delays for diluting or mixing. No need for extra containers.

**LASTS LONGER** Will not oil out, plate out, settle or precipitate in most applications. Ideal for continuous processing.

**STABLE** Long storage life — stays uniform even if frozen or boiled. Retains effectiveness after sterilization.

### TEST

**ANTIFOAM B AT NO EXPENSE . . .**

Write, wire or phone today for a generous FREE SAMPLE and full particulars . . .



Address Dept. 3209.

**DOW CORNING CORPORATION**  
Midland, Michigan

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (SILVER SPRING, MD.)  
CANADA: DOW CORNING SILICONES LTD., TORONTO GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON FRANCE: ST. GOBAIN, PARIS

When inquiring check 7344 opposite last page



# ATLAS

CHEMICALS DIVISION

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Atlas Powder Company, Canada, Ltd., Brantford, Ontario, Canada

## ...for the CHEMICAL INDUSTRY:

### Counter-current treatment with activated carbon

In purification processes where powdered activated carbon is used, the counter-current method of dosage, developed by Atlas, can save as much as 40% of the carbon in comparison with the one-shot treatment. A 30-page Atlas booklet, "Handbook for Counter-Current Treatment with Activated Carbon," describes in detail both the technique and economics of the treatment. The handbook includes a dosage chart which greatly simplifies calculation of counter-current dosage. Check "Counter-Current Treatment" on the coupon below.



## ...for the COSMETICS INDUSTRY:

### Calculation of HLB values

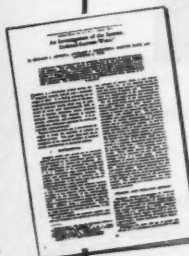
The Atlas HLB (hydrophile-lipophile balance) system gives chemists a mathematical method by which surfactants can be related to the functions they are called upon to perform. The system applies to a variety of surfactants made by Atlas and by other manufacturers. Numerical HLB values can be easily calculated for polyol fatty acid esters, tall oil and rosin esters, and fatty alcohol ethylene oxide condensation products. An Atlas publication, "Calculation of HLB Values of Non-Ionic Surfactants," lists HLB values for some 100 Atlas surfactants, as well as for 30 surfactants of other manufacturers, also shows method for calculating values. Check the coupon below.



## ...for the PHARMACEUTICAL INDUSTRY:

### Behavior of sorbitol-sucrose-water systems

Sorbitol, a hexahydric alcohol, finds increasing use in product formulation because of its pleasant taste, humectant action, chemical inertness, and high viscosity in aqueous solution. A method has been developed for the analysis of sorbitol-sucrose-water systems. This method, along with the solubility behavior of such systems, is reported in an article in the Journal of the American Pharmaceutical Association, "An Investigation of the System: Sorbitol-Sucrose-Water." Check the coupon below for a reprint.



#### ATLAS POWDER COMPANY

Dept. ASP, Wilmington 99, Delaware

Please send me the Atlas data checked below.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

- ☐ Counter-Current Treatment  
☐ Calculation of HLB Values  
☐ Sorbitol-Sucrose-Water Systems

When inquiring check 7345 opposite last page

## MATERIALS

**Polyethylenes combine stiffness with easy processing, low permeability . . .**

do not become brittle even at temperatures as low as  $-148^{\circ}$

**Uses:** For making films, bottles, wire and paper coatings and for injection molding.

**Features:** Resins combine the advantages of high density with adaptability to a wide variety of processing conditions. In films, Alathon 34X is extremely transparent and sparkling. In "squeeze" bottles, its greater stiffness makes use of thinner wall sections possible and gives superior "snap-back" at equal wall thicknesses. Its higher density means greater impermeability to greases, essential oils, and oxygen.

High density and good high- and low-temp properties suit Alathon 34X to wire coatings. Extremely resistant to deformation and abrasion, 34X does not become brittle even at  $-148^{\circ}\text{F}$ .

Alathon 37X has superior grease resistance and low water vapor transmission rate. Its high melt index gives it advantages in speed of application to paper.

**Description:** Alathons 34X and 37X are polyethylene resins with a density (crystallinity) intermediate between the conventional polyethylenes and the new linear materials. They have a moderately narrow distribution of mw's. 34X has a low melt index while 37X has a moderately high melt index. Both are non-toxic and essentially free of taste and odor. Alathon 37X gives moldings with outstanding surface gloss. Chemical resistances are excellent. Preliminary tests show the resins have these properties:

	Alathon 34X	Alathon 37X
Melt index (dg/min)	1.9	12
Sp gr	0.930	0.930
Stiffness (psi)	45,000	43,000
Tensile strength (psi at $73^{\circ}\text{F}$ )	2300	2000
Elongation (% at $73^{\circ}\text{F}$ )	200	200
Softening temp (Vicat, $^{\circ}\text{F}$ )	220	215
Stress crack resistance (Bell Lab, hr)	0.3	0.1
Brittleness temp ( $^{\circ}\text{F}$ )	$<-148$	$<-148$
Hardness (Shore)	D55	D55
Mold shrinkage (in/in)	0.035	0.035
Water absorption (%)	0.01	0.01
Dielectric constant (60 c to 100 mc)	2.3	2.3
Power factor (60 c to 100 mc)	0.0005	0.0005

(Polyethylene resins are products of Polychemicals Dept., E.I. du Pont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. . . or for more information check 7346 on form which is located opposite last page.)

# ELEMENTAL BORON

in commercial quantities

manufactured to meet your specific needs!

Today's elemental boron, no longer a laboratory curiosity, is a fast-growing chemical with important commercial aspects. For those working in Boron Chemistry, Trona\* now offers several grades of elemental boron to meet your specific needs. Trona, a world leader in the development of commercial boron, has the technical know-how and production facilities to fill your orders in any quantity without delay.

#### CURRENT FIELDS OF APPLICATION:

In the Military, elemental boron is being used in Ordnance applications for flares, fuses, ignitors, and propellant mixtures. Commercially, it is used in borides for high temperature applications, and with plastics for lightweight neutron shields.

To get more information about Trona's special grades of elemental boron, call your Trona technical representative today.

## TRONA

Contact Sales Development Department

**American Potash & Chemical Corporation**

3030 W. Sixth St. 99 Park Avenue  
Los Angeles 54 New York 16  
DUmkirk 2-8231 OXford 7-0544

\*TRADE MARK AP&C

When inquiring check 7347 opposite last page

CHEMICAL PROCESSING

**Shrink- and crease-proofs  
cottons, rayons,  
synthetics . . .**

modified urea resin is durable to repeated laundering

**Uses:** Gives creaseproofing, shrinkproofing, and embossing effects to cottons, rayons, acetates, and synthetics.

**Features:** Effects are durable to repeated laundering. Resin has been successfully mill-tested in making "minimum-care" and "drip-dry" finishes.

**Description:** Thermosetting textile resin is a low-polymeric resin of the modified urea type. It has long storage life, is readily soluble and compatible, and gives pad baths of long stability. It is applied and cured with Hartex Catalysts RH or E4.

(Hartoset E resin is a product of Hart Products Corp., Dept. CP, 1440 Broadway, New York, N.Y. . . . or for more information check 7348 on the convenient Reader Service slip which is located opposite last page.)

**All about color**

What is color? How are new colors discovered? These questions are answered in 12-page oversized booklet. Suggestions are given on how color can be applied to different materials with a view toward design, engineering, and marketing. Illustrations are both chromatic and achromatic. These and other terms are defined in a glossary that is included with the text.

"Color Comes of Age" is issued by Organic Chemicals Div., American Cyanamid Co., Dept. CP, Bound Brook, N.J. When inquiring reader may simply check 7349 on form opposite last page.

For more information on product at right, specify 7350 . . . see information request blank opposite last page.



*Opportunity Knocking  
with a  
Triphammer Beat!*

**NATIONAL®  
ADIPIIC  
ACID**



Volume production of Adipic Acid at our Hopewell, Va. plant opens the way to commercial development of new products based on adipic esters, particularly in plastics, plasticizers, rubber and lubrication oils. You are assured of uninterrupted supply based on our efficient, continuous process and fully-integrated production right back to basic raw materials within the Allied Chemical group.

National Adipic Acid is outstandingly good. It consistently analyzes 99.7% minimum purity, it is light in color and low in iron.

**WRITE FOR TECHNICAL BULLETIN I-12**

This 8-page bulletin gives complete physical and chemical properties; principal reactions of the carboxyl and alpha methylene groups; solubility curve, suggested uses and literature references. Working samples and quotation on request.

**NATIONAL ANILINE DIVISION  
ALLIED CHEMICAL & DYE CORPORATION  
40 RECTOR STREET, NEW YORK 6, N. Y.**

Boston Providence Charlotte Chicago San Francisco Atlanta  
Portland, Ore. Greensboro Philadelphia Richmond Akron  
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto



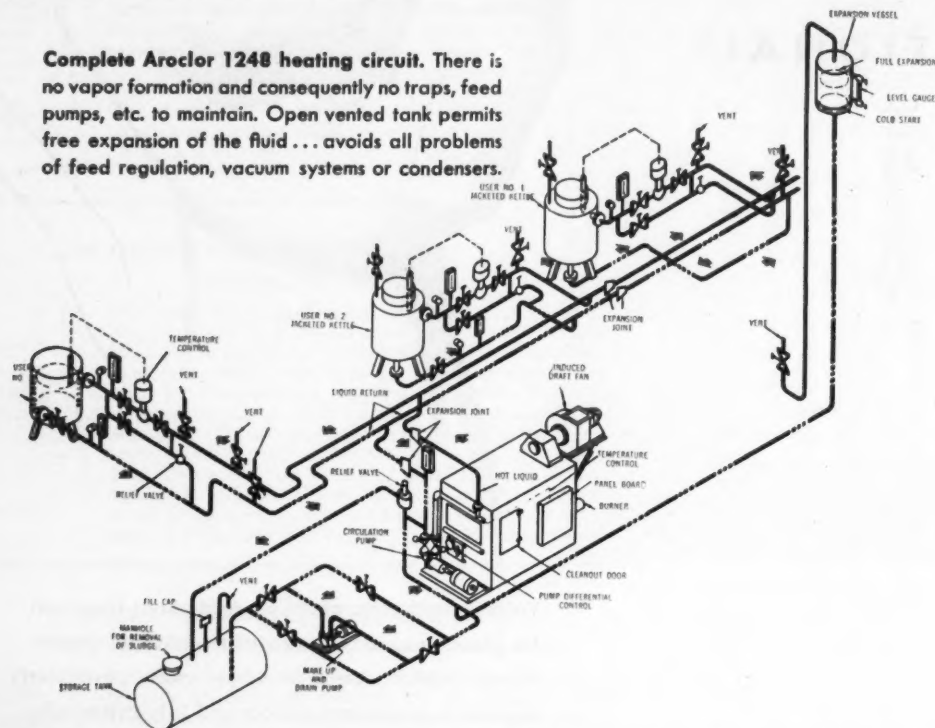
Now . . . **NON-PRESSURIZED** liquid-phase heat systems that operate up to **600°F.**

# AROCOLOR 1248

**Operates at atmospheric pressure...cuts installation and maintenance costs of expensive pressurized systems.**

**Fluid is fire-resistant...increases safety by eliminating direct-firing, or heat transfer with flammable fluids.**

**Complete Aroclor 1248 heating circuit.** There is no vapor formation and consequently no traps, feed pumps, etc. to maintain. Open vented tank permits free expansion of the fluid...avoids all problems of feed regulation, vacuum systems or condensers.



**The Equipment**...capacities can range from small portable units—usually electrically heated—to large gas- or oil-fired units generating from 250,000 to over 10,000,000 B.T.U.'s per hour. Circuits are closed, forced-circulation. Compact design saves space, minimizes installation and maintenance costs.

**The Fluid**...Aroclor 1248 is a highly stable chlorinated polyphenyl; does not support combustion up to its boiling range 652° to 725° F.; has autogenous ignition temperature of extremely high 1299° F.; is non-corrosive. Aroclor 1248 operates in most systems four to seven years without replacement.

## MONSANTO

### Contact Monsanto for SOURCES of AROCLOR 1248 heating systems

Write to us on your company letterhead. We will send you technical information about Aroclor 1248 and/or the names of Aroclor 1248 heat-transfer system manufacturers and designers. Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. IF-2, St. Louis 1, Missouri.

AROCOLOR: Reg. U. S. Pat. Off.

## MATERIALS

**Paste pigments are non-hygroscopic, non-oxidizing, non-corrosive, and non-hydrolyzing . . .**

copper, bronze, and iron paste pigments are not discolored

**Uses:** In the manufacture of paints, varnish, enamels, and inks.

**Features:** Paste pigments are non-hygroscopic, non-oxidizing, non-corrosive, and non-hydrolyzing in the presence of water, acids, or alkalis.

**Description:** Wetting agent incorporated in paste pigments is a halogenated, mobile, oily-like viscous liquid which remains permanently plastic. Product does not contain mineral spirits or oils. Wetting agent employed lubricates, coats, and polishes the metallic pigment flakes, producing a pigment paste possessing durability, permanence, brilliance, luster, and high gloss.

Paste pigments of copper and bronze do not discolorize and oxidize, even when exposed to moisture and corrosive conditions. A variety of other metallic pigments can be used.

(CPC paste pigments are product of Chemical Sealers, Inc., Dept. CP, Belleville, Ill. . . or for more information check 7352 on form opposite last page.)

**Inorganic that's like an organic: phosphonitrilic chloride occurs in a cyclic structure . . .**

use in polymers, binders, lube oils seen

**Uses:** As a coating and binder for glass, ceramics, asbestos, and metals; as a lubricant additive; and as an intermediate for polymers.

**Features:** Product has a cyclic structure, yet is completely inorganic. Coatings or binders made from it are tough, rubber-like, and have high heat, flame, water, and solvent resistance. A maximum temp which the polymerized material can withstand and still be useful is not clearly established and it will probably vary with the application involved; however, depolymerization of the polymer alone begins just above 662°F.

In lube oils, high-mw polymers improve load-bearing capacity and viscosity index when added to the extent of 1-3%. Esters can serve in extreme-pressure lubricants and as anticorrosives in oils and specialty greases. The 2, 3-dibromopropyl ester imparts flame resistance to cotton. The partly depolymerized butyl ester has a plasticizing effect in nitrocellulose films and lacquers.

Increased heat resistance is imparted to established polymers by incorporating the material into them. Use in a polymeric plasticizer that would chemi-

When inquiring check 7351 opposite last page



cally combine to the resins is suggested. This would minimize migration and increase extraction resistance. Primary amine derivatives are catalysts and cross-linking agents for epoxy resins.

**Description:** Phosphonitrilic chlorides occur in a cyclic structure, with formula  $(\text{PNCl}_2)_n$ , where "n" varies from 3 to 12. A refined grade, about 75% the trimer and 25% the tetramer, is available as a light colored crystalline material. Technical grade is a dark, pasty mass, consisting of a mixture of the trimer and the higher polymers. Toxicity data are absent, but continued exposure to the chemical is not suggested. Typical properties of the various polymers are shown:

$(\text{PNCl}_2)_n$ where n =	Melting point (°C)	Boiling point (°C @ 13 mm)
3	114	127
4	123.5	188
5	40.5-41.0	223.0-224.3
6	90	261-263
7	<-18	289-294
n	<500	depolymerizes

(Phosphonitrilic chloride is a product of Millmaster Chemical Corp., Dept. CP, 295 Madison Ave., New York 17, N.Y. . . . or for more information check 7353 on form opposite last page.)

**A stable and reactive compound,  
dimethyl ester of ADA is more  
versatile than parent acid . . .**

offers many routes to preparation of organics, pharmaceuticals, chelating agents

**Uses:** Intermediate is useful in making drugs, insecticides, dyestuffs, chelating agents, amino acids, and other complex organic compounds.

**Features:** Price is lower than parent acid, acetonedicarboxylic acid. Ester is stable yet reactive, and is considered an even more useful and versatile intermediate than the free acid.

Ester reacts at the carbonyl group, the carbomethoxy groups, and progressively at the active methylene groups. It condenses with a number of compounds to form oxygen- and nitrogen-containing heterocyclics. Ester forms tightly-bound, bright red iron chelates with are soluble in certain non-aqueous media; with copper, an insoluble salt is formed.

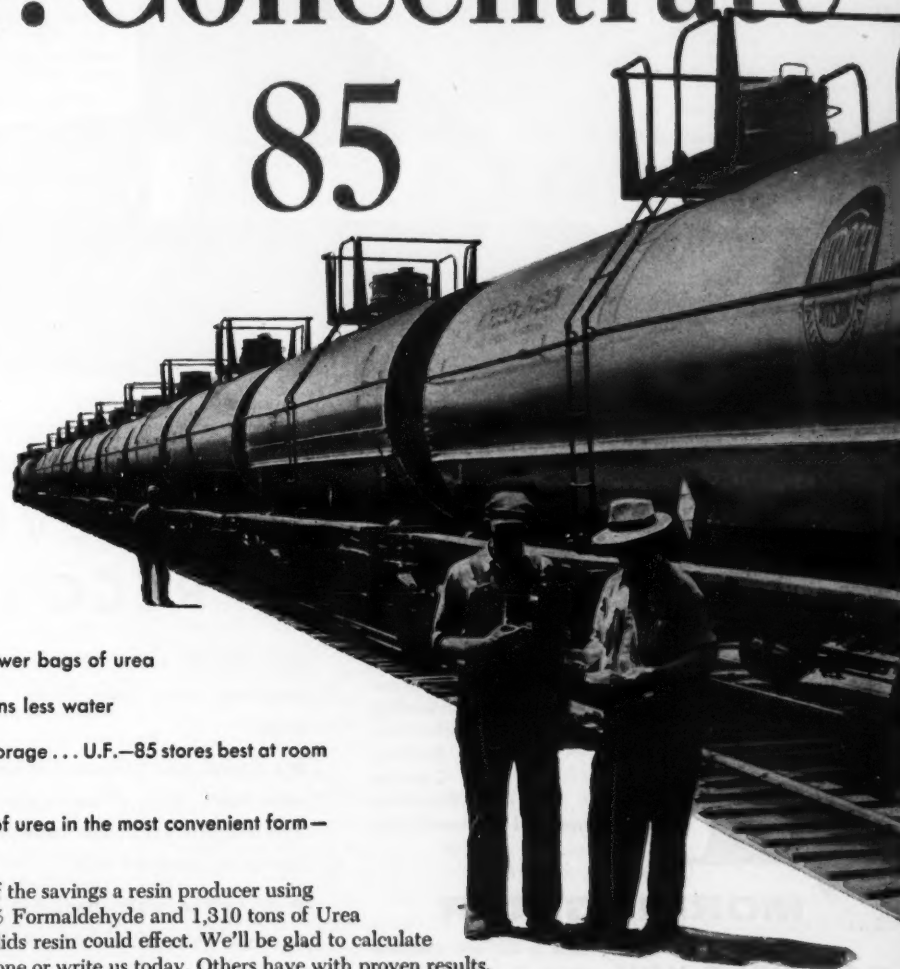
**Description:** Dimethyl acetonedicarboxylate (DMADA) is a white to slightly yellow, viscous liquid derived from fermentation. Available in pilot plant quantities, it has an empirical formula  $\text{C}_7\text{H}_{10}\text{O}_5$ . Boiling range at 2 mm (Hg) is 95-99°C and density is 1.2 gm/ml @ 25°C. It does not need refrigeration during storage.

(DMADA is a product of Chas. Pfizer & Co., Inc., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y. . . . or for more information check 7354 on form opposite last page.)

# unload 37 fewer tank cars of \*Formaldehyde

...and get these other savings too, with

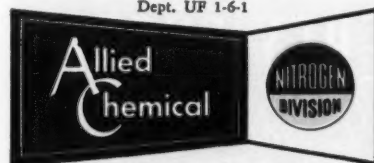
# U.F. Concentrate 85



- Handle 11,500 fewer bags of urea
- Evaporate 819 tons less water
- Save on heated storage . . . U.F.—85 stores best at room temperature
- Handle 575 tons of urea in the most convenient form—liquid

\* These are some of the savings a resin producer using 3,450 tons of 37% Formaldehyde and 1,310 tons of Urea making a high solids resin could effect. We'll be glad to calculate your savings. Phone or write us today. Others have with proven results.

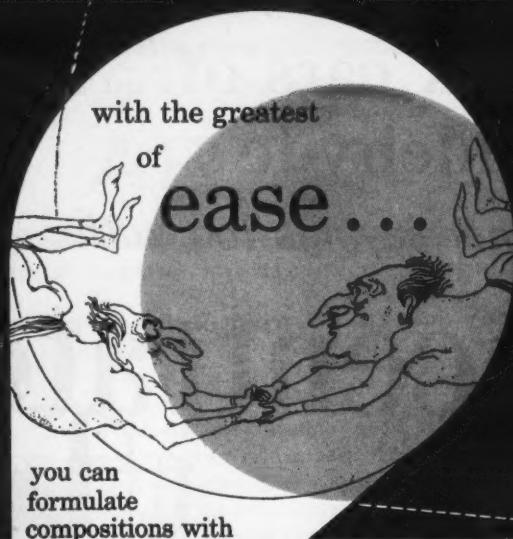
Dept. UF 1-6-1



40 Rector Street, New York 6, N. Y.

Ethanolamines • Ethylene Oxide • Ethylene Glycols • Urea • Formaldehyde • U. F. Concentrate—85 • Anhydrous Ammonia • Ammonia Liquor • Ammonium Sulfate • Sodium Nitrate • Methanol • Nitrogen Solutions • Nitrogen Tetroxide • Fertilizers & Feed Supplements

When inquiring check 7355 opposite last page



# PICCOLASTIC



## PICCOLASTIC SYNTHETIC RESINS

24 standard grades—polymers of  
styrene and its homologues

Made in five series and twenty-four standard grades, Piccolastic Resins are pale in color, soluble in aromatic hydrocarbons, alkali and acid resistant to a high degree, do not support mold or other fungus growth, and are not subject to enzyme reaction.

Being permanently thermoplastic, they make excellent stable, hot melt compounds.

Piccolastic Resins vary from viscous liquids through tacky solids, brittle solids to resins of hard horny toughness.

Pennsylvania Industrial Chemical Corp.

Clairton, Pennsylvania

Plants at

Clairton, Pa., West Elizabeth, Pa., and Chester, Pa.

Sales Offices

Boston, New York, Detroit, Chicago, Cincinnati  
Los Angeles, Philadelphia, Pittsburgh

When inquiring check 7356 opposite last page



if your **Gum or  
Starch  
Problem**  
is

- Water Absorption
- Thickening
- Emulsification
- Binding
- Coating
- Finishing
- Chemical Compatibility

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CAN HELP YOU

Here is the one complete source for laboratory controlled water soluble GUMS, NATURAL AND PROCESSED STARCHES, DEXTRINES.



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leadership through products—leadership through service

When inquiring check 7357 opposite last page

## activated carbons for SOLVENT RECOVERY

ADSORBITE® activated carbons are everyday recovering practically every known solvent used in commercial quantities.

We furnish new carbons for both new and existing systems. Many types of used carbons can be reactivated to their original adsorptive capacity and re-used at a fraction of replacement cost.

Want further information? Tell us about your solvent recovery system, let us show you what we can do.

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Company

CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec

When inquiring check 7358 opposite last page

## MATERIALS

### Increased oil solubility added to petroleum sulfonates by alkaline earth cations

Use in rust preventives, fuel oil and grease additives recommended. Two sodium sulfonates also described

Neutral calcium and barium sulfonates have increased oil solubility. Although high-mw sulfonates have a high degree of oil solubility, these products, called Petrosuls, contain alkaline earth cations that make them even more soluble in oil. Use in rust preventives and in fuel oil and grease additives is recommended.

Two sodium sulfonates have also been introduced. Alkosul 645 is a sodium sulfonate product made from a synthetic alkylate feedstock. It is recommended for use in rust preventives and additive formulations, and as a raw material for making motor oil additives.

Petrosul 645 is a controlled blend of segregated natural petroleum sodium sulfonates that has a broad molecular weight distribution. It is well suited for applications where overlapping properties — such as emulsibility and corrosion protection — are needed, or where a single sulfonate product is required to function in different type formulations.

All four sulfonates are bright reddish-brown, viscous fluids.

#### Typical Physical Properties

	Calcium Petrosul	Barium Petrosul	Alkosul 645	Petrosul 645
Molecular wt (avg)	1000- 1040	1100- 1140	440- 465	455- 465
Sulfonate (wt %, min)	40	40	62	62
Mineral oil (wt %, max)	58	58	35	35
Water (wt %, max)	3	3	5	5
Alkalinity (wt % Na <sub>2</sub> O, max)	0.2	0.2	0.3	0.3
Inorganic salts (wt % Na <sub>2</sub> SO <sub>4</sub> , max)	0.5	0.5	0.5	0.5
Sp gr (60°/60°F)	0.96	0.98	1.01	1.03
Color (ASTM, 5% wt soln of 100% sulfonate in 30+ Saybolt white oil)	4 1/2	4 1/2	2 3/4	3 1/2
Viscosity (cps @ 180°F, Brookfield)	260	1300	480	1900
Ash content (wt % metal SO <sub>4</sub> )	5.3	8.3	10.4	10.2

(Petroleum sulfonates are products of Petroleum Sulfonate Dept., Pennsylvania Refining Company, Dept. CP, Butler, Pennsylvania . . . or for more information about manufacturer's product, reader may simply check 7359 on form which is located opposite last page.)

## MATERIALS

### Yellow-red toners are low in cost, low bleeding . . .

show advantages in printing  
inks, rubber and plastics

Uses: For printing inks, rubber and plastics.

Features: Toners give very stable moisture-set inks of excellent body and flow. Bleed in water and fat bleed is slight. In lithographic varnish, toner also produces an ink of good body and flow that is well suited to offset and letterpress work. Shades are brilliant yellow-red.

The reds have exceptional heat stability and do not migrate or crock. They are well suited for use in rubber, vinyl plastics and polystyrene.

Description: The azo red toners are designated Arcturus Red CP 1270, which is non-resinated, and CP 1275, which is resinated. CP 1275 is slightly brighter, yellower, and darker than CP 1270, and has considerably less bronze. Toners are low in cost.

(Red toners are products of Pigment, Color and Chemical Div., The Sherwin-Williams Co., Dept. CP, 300 W. Lake St., Chicago 6, Ill. . . or for more information check 7360 on form opposite last page.)

### Fragrances for aerosol space deodorants

Fragrances for glycol, oil-base, and metazene type aerosol space deodorants are listed in 7x10" folder, punched for notebook insertion. Prices and a typical formulation are given.

Bul No. 2 is issued by Dodge & Olcott, Inc., Dept. CP, 180 Varick St., New York 14, N.Y. When inquiring specify 7361 on form opposite last page.

For more information on product at right, specify 7362 . . . see information request blank opposite last page.



# CHEMICAL ENGINEERING NEWS

PROPERTY AND APPLICATION DATA  
ON THESE VERSATILE ENGINEERING MATERIALS:  
"ZYTEL," "ALATHON," "TEFLON," "LUCITE"

## Ball valve seals of molded TEFLON® are chemically inert . . . withstand extreme temperatures and pressures

### Gaskets and packings of chemically inert TEFLON® are tough and heat-resistant

The opportunities for improved performance that TEFLON tetrafluoroethylene resin offers the chemical field is without parallel. Its use in process equipment saves money through reduced maintenance; lowered replacement costs; increased productive capacity (because of less downtime); reduced wear on piston, shafts, etc.; and simplified design. TEFLON may improve the quality of the product by eliminating contamination. In many instances, TEFLON has been found to be the only material that would give satisfactory performance.

Gaskets and packings of TEFLON provide exceptionally long life, which lowers maintenance, and cuts replacement costs and downtime. Because of the low-friction characteristics of TEFLON, the torque required to turn shafts or stems is minimized.

In addition to its use in gaskets and packings, TEFLON gives exceptional performance in such items as valve seats, discs, diaphragms, bearings, pipe and fittings.



**MOLDED BALL SEALS** of Du Pont TEFLON provide tight, long-lasting, chemically inert seals. This valve controls air flow in North American Aviation Corporation's F-86. Valve manufacturer is Koehler Aircraft Products Company, Dayton, Ohio; fabricator of the ball seals of TEFLON is Sparta Manufacturing Company, Dover, Ohio.

The unique combination of properties of TEFLON tetrafluoroethylene resin permits a practical and economical handling of fluids at high temperatures and pressures. In motor-operated valves, manufactured by the Koehler Aircraft Products Company, Dayton, Ohio, two ball seals of TEFLON provide a leak-proof seal, even when subjected to temperatures from -65°F. to 400°F. and pressures as high as 350 psi.

These seals of TEFLON retain their original size, whether they are in constant contact with hydraulic fluids, or water, air, and other elements which could cause swelling in ordinary materials. The extremely low coefficient of friction of TEFLON enables the ball

to rotate easily within the two seals, opening or closing the valve.

TEFLON is chemically inert. It is suitable for use within the temperature range of -450°F. to 500°F. It is resilient and tough. This combination of properties recommends its use for diaphragms, seals, gaskets, packings and filters. Since TEFLON is unaffected by corrosives, its use greatly enlarges the range of materials a given piece of equipment can safely handle.

If your problem involves extremes of temperature and highly corrosive chemicals, a further look into the properties of Du Pont TEFLON may very well provide your answer. Clip the coupon below for complete property and application data.

### SEND FOR MORE INFORMATION

For complete details that will help you further evaluate Du Pont TEFLON for use in your product-development programs, mail the coupon at the right. Specific property and application data will be sent to you.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department  
Room 789, Du Pont Building, Wilmington 98, Delaware  
In Canada: Du Pont Company of Canada Limited, P.O. Box 660, Montreal, Quebec

Please send me complete property and application data on Du Pont TEFLON.

I am interested in evaluating this material for

Name \_\_\_\_\_  
Firm Name \_\_\_\_\_  
Position \_\_\_\_\_  
Type of Business \_\_\_\_\_  
Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



## your "rolling pipe line"

More than 2600 Olin Mathieson tank cars are in service every day shuttling between a score of production points and our customers to assure dependable delivery of Mathieson Chemicals.

In a sense, they form a "pipe line" connecting major consuming and producing areas. And, they perform the important function of balancing out local shortages and surpluses.

If you're ever caught short of an essential chemical raw material, the flexibility of a multi-plant producer can prove invaluable. Our "pipe lines" carrying caustic, chlorine, ammonia, sulphuric acid, methanol and organics may be the answer to your supply problems. Talk it over with an Olin Mathieson representative soon.

**MATHIESON CHEMICALS**  
OLIN MATHIESON CHEMICAL CORPORATION  
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD. 3954



**INORGANIC CHEMICALS:** Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Potash • Caustic Soda • Chlorine • Hydrazine and Derivatives  
Hypochlorite Products • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chloride Products • Sulphate of Alumina • Sulphur (Processed)  
**Sulphuric Acid • ORGANIC CHEMICALS:** Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylene  
Formaldehyde • Methanol • Sodium Methoxide • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorobenzene • Polychlorobenzene • Trichlorophenol

When inquiring check 7363 opposite last page

## MATERIALS

### Light-fast, stable colors pigment urethane foams . . .

dispersed colors are smooth, free-flowing

Uses: For pigmenting urethane foams.

Features: Colors are light-fast, stable to heat, and resist action of additives used in making foams. Pastes are smooth and free-flowing and can be added at any point prior to the foaming stage.

Description: Colors are dispersed in a polyester of closely controlled quality. As a starting point, one pph of color paste is suggested.

("UR" Series of color paste concentrates is a product of Claremont Pigment Dispersion Corp., Dept. CP, 39 Powerhouse Rd., Roslyn Heights, L.I., N.Y. Check 7364 opposite last page.)

### SHARE THE GAG!



Has it ever struck you that there are moments when chemical processing becomes comical processing? Next time something funny happens in the plant or lab, why not share the laugh with **CHEMICAL PROCESSING** readers?

If you can draw, send your cartoon in black ink on an 8½ x 11" sheet, ready to reproduce. We'll pay you \$10 if it is accepted.

If you have a cartoon idea you can't draw, send in a description or rough sketch of the scene, and the caption. We'll send you \$5 on acceptance.

Send your cartoon or idea to:

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**CHEMICAL PROCESSING**  
111 East Delaware Place  
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

## MATERIALS

### Transmission data on UV absorbers

Complete transmission data for various plastic film thicknesses containing specific concentrations of company's ultraviolet light absorbers are represented graphically in 20-page brochure. Composition and properties, compatibility with plastics, stability, and suggested uses for various UV absorbers are included. Two pages are devoted to schematic diagrams of electromagnetic spectrum and pictorial presentation of ultraviolet and visible spectrums.

"Uvinuls" is issued by Antara Chemicals Div. of General Aniline & Film Corp., Dept. CP, 435 Hudson St., New York 14, N. Y. When inquiring reader may simply specify 7365 on form opposite last page.



"Hold 'er at six fathoms! Prepare all torpedo tubes! Up periscope!"

Cartoon by Ken Boyea, Hercules Powder Company, Holyoke, Mass.

For more information on product at right, specify 7366 . . . see information request blank opposite last page.

this 58-page booklet contains  
the most comprehensive  
data ever compiled on

## MALEIC ANHYDRIDE

If you use or may use Maleic Anhydride, you'll find a wealth of valuable data in this expanded, second-edition of our basic manual "National Maleic Anhydride".

It contains (1) the most complete tabulation of physical properties ever printed, many determined by National's Research Laboratory (2) 14 pages of chemical properties and reactions, copiously illustrated with 47 informative structural diagrams, (3) a graphic "family-tree" presentation of Maleic Anhydride derivatives and resulting end-products, (4) 17 pages of suggested uses with literature abstracts, and (5) a bibliography of 333 references!

Published in a limited edition, this booklet is a valuable reference work for present and prospective users of Maleic Anhydride . . . send for your copy today.

## MALEIC ANHYDRIDE

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## How to Keep Your Production Chemist Young

That top-flight production chemist of yours may often wish he were enjoying his cradle days again—particularly when he's being haunted by production troubles due to variations in chemical materials quality.

Fortunately, there's one sure way to help him avoid these hair-graying experiences: *Buy proven, first quality materials.* When you specify uniform, high purity *Pittsburgh* Phthalic Anhydride, for example, you enjoy these positive benefits:

1. Production problems due to inconsistent phthalic quality are eliminated.
2. Expensive down time is minimized.

3. Far less quality control is required, freeing your chemist's time for other important work.
4. Customer complaints are reduced, costly adjustments and service calls are cut to the bone.
5. Better product quality stimulates sales; reduced production costs increase your profits.

And to this list you can add Pittsburgh's reputation for fast reliable deliveries and the complete facilities of its technical service department. Ask your *Pittsburgh* man for proof of these benefits. He has the complete story.

### Pittsburgh Industrial Chemicals

Plasticizers	Benzene
Phthalic Anhydride	Toluene, Xylene
Maleic Anhydride	Pyridine
Fumaric Acid	Alpha Picoline
Phenol	Beta Gamma Picoline
Ortho Cresol	Sulphuric Acid
Meta Para Cresol	Ammonium Sulphate



WSW 8200A

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When inquiring check 7367 opposite last page

## MATERIALS

**Tonnage quantities at low price  
coaxes increasing interest  
in lactose uses . . .**

98%-pure grade is now priced at 81½¢ per pound

Lactose, more commonly known as milk sugar, is now selling at a price of 1/3 to 1/4 that of just a few months back. This favorable economic picture, coupled with an unlimited supply, is stimulating renewed interest for this sugar in the chemical processing industries.

Classified as a disaccharide, lactose is made up of two C<sub>6</sub> sugars, glucose and galactose. The crude grade is 98% (minimum) lactose monohydrate. Particles will pass a 10-mesh sieve. Other specs:

Moisture (%)	<0.40
Acidity (% as lactic)	<0.40
Protein (N x 6.25, %)	<1.00
Ash (%)	<0.75

Lactose is finding use as a chemical intermediate, in fermentation, and as a component in various products.

(Lactose is a product of Food Products Div., Western Condensing Co., Dept. CP, PO Box 739, Appleton, Wis. . . . or for more information check 7368 on the convenient Reader Service slip which is located opposite last page.)

## Covers coating formulations using PVA

Rapid drying is one of the major advantages of coatings prepared from formulations using polyvinyl acetate as outlined in eight-page bulletin. Formulations for a primer, flat white paint, and an interior or exterior paint are given.

Bul on Resoflex R-296 is issued by Cambridge Industries Co., Inc., Dept. CP, 101 Potter St., Cambridge 42, Mass. When inquiring specify 7369 on the convenient Reader Service slip which is located opposite last page.

There are sound  
reasons why . . .

this magazine  
is "different"!

CHEMICAL PROCESS-  
ING'S format, editorial  
content, and style of  
presenting articles  
mean easier, faster  
reading for you . . .  
simplify your task of  
keeping up with the  
latest developments.  
Read why on page  
100.



**Cationic surface-active agent  
emulsifies pentachlorophenol  
in water . . .**

concentrates are useful as herbicide, defoliant, and soil toxicant

Chemical developed specifically for emulsification of pentachlorophenol in water is announced. Dark red liquid chemical is a cationic surface-active agent, called Emulsifier 1990-A. Concentrates containing the emulsifier disperse instantly upon addition to water.

Pentachlorophenol is useful as a herbicide, defoliant, and soil toxicant. It is recommended for control of weeds and grasses in agricultural and industrial applications and may be used as a soil toxicant to control termites around wooden structures.

For emulsifiable concentrates containing up to 15% pentachlorophenol, 1 to 5% emulsifier is used. Concentrate is prepared by heating the mixture of pentachlorophenol and solvent to form a solution to which the emulsifier is added. End user adds concentrate to water when he is ready to apply the chemical.

(Emulsifier 1990-A is product of Chemical Div., Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. . . . or for more information check 7370 on form opposite last page.)

**Polymer sets in strain-free form,  
has excellent dimensional  
stability . . .**

water absorption is nil, chemical inertness high

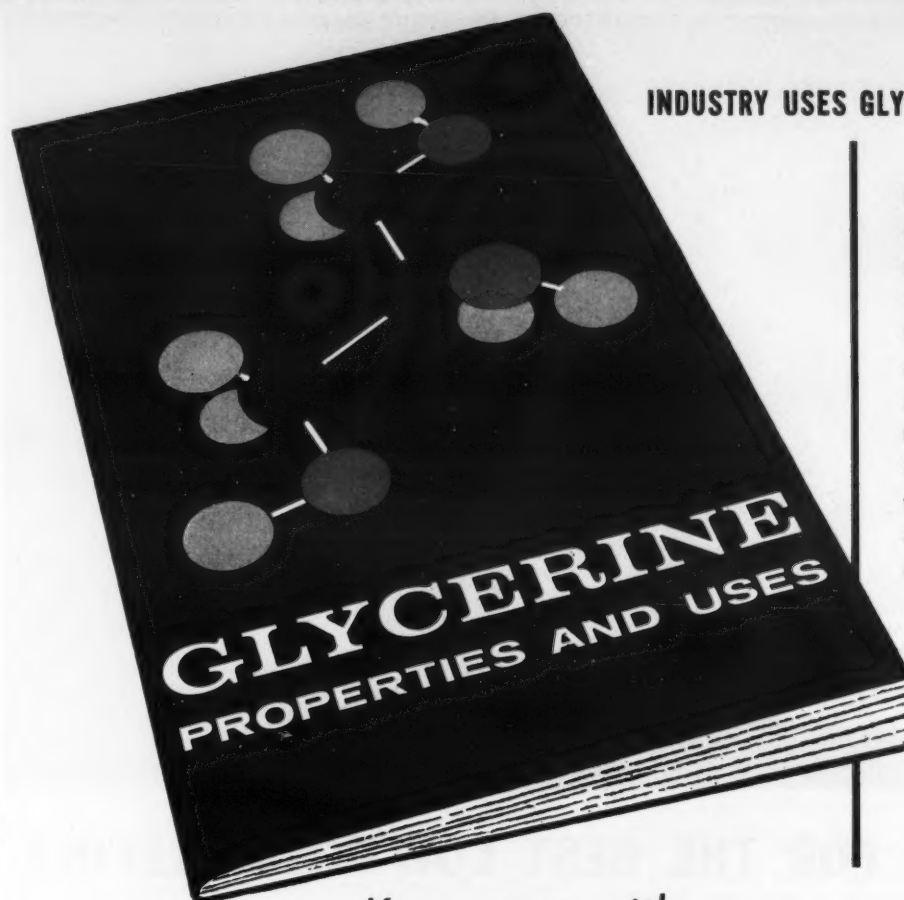
**Uses:** Potential at present is in industrial plastics.

**Features:** A thermoplastic, product hardens in a strain-free form by crystallizing, rather than by heat removal. Dimensional stability is excellent, and of an order not previously attainable in plastic materials. Temp changes do not cause warping. Water absorption is 0.01%. Plastic is insoluble and chemically inert to just about everything but hot chlorinated solvents and fuming nitric acid.

**Description:** Produced in semicommercial scale, plastic is a polyether prepared by polymerizing a chlorinated oxetane:3,3-bischloro-methyl oxetane, to be exact.

Fairly hard and rigid, strength properties at room temp are in same range as plastics in general; however, these are retained at higher temp than most thermoplastics. Electrical properties are good, especially where adverse conditions must be met, such as exposure to water or to wide temp fluctuations.

(Penton is a product of Hercules Powder Co., Inc., Dept. CP, Wilmington 99, Del. . . . or for more information check 7371 on form opp. last page.)



**INDUSTRY USES GLYCERINE AS:**

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plasticizer  
lubricant  
sweetener  
anti-freeze  
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This free booklet gives a description of Glycerine's physical, chemical and physiological properties, and its applications in such fields as pharmaceuticals, toilet goods, foods, cellophane and alkyl resins. In these and literally hundreds of other specialties, *nothing takes the place of Glycerine.*

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When inquiring check 7372 opposite last page

SPECTROGRAPHIC TESTS of Sunoco Propylene Trimer disclose new structural information of interest to chemists trying to reduce costs... increase yields...discover new uses.

## LOOKING FOR THE BEST LOW-COST OLEFIN?

**No other olefin is potentially more useful, or lower in cost, than Sunoco Propylene Trimer**

Recent spectrographic tests of Sunoco® Propylene Trimer show that this C<sub>6</sub> propylene polymer "cut" is composed almost entirely of mono-olefins ...with about 16% of the double bond in the terminal position. Distribution of the olefin types is indicated as follows:

### Terminal Olefins:

R-CH=CH <sub>2</sub>	4%
R <sub>1</sub>	
R <sub>2</sub> > C=CH <sub>2</sub>	12

### Non-terminal Olefins:

R <sub>1</sub> > C=C < H (trans)	15
H	
R <sub>2</sub>	
R <sub>1</sub> > C=C < R <sub>2</sub> (cis)	3
H	
H	
R <sub>1</sub> > C=C < R <sub>3</sub>	41
R <sub>2</sub>	
H	

### Remainder:

25  
(Presumably tetra-substituted olefins)

**FREE TECHNICAL BULLETINS ON OTHER SUNOCO PETROCHEMICALS**  
Benzene • Toluene • Mixed Xylenes • Propylene Tetramer • Sunaptic® Acids (High Molecular Weight Naphthenic Acids) • PDO-40 (Polymerized Drying Oil) • Sulfonate WS (Water Soluble Sulfonates) • Sulfur • Anhydrous Ammonia

Sunoco Propylene Trimer is butylene-free and low in sulfur. It has a narrow distillation range... eliminates color problems in end products. Producers are obtaining high yields using Sunoco Propylene Trimer in the synthesis of various chemical intermediates such as nonyl phenol and in alkylation reaction with aryl groups in the production of synthetic detergents.

To get your copy of the spectrographic analysis and complete information about Sunoco Propylene Trimer, write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. CP-9.



**INDUSTRIAL PRODUCTS DEPARTMENT  
SUN OIL COMPANY**  
PHILADELPHIA 3, PA. • SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

When inquiring check 7373 opposite last page

## MATERIALS

### Batch-to-batch uniformity in coloring polyethylene with color concentrates . . .

colors can be stable under any production and end-use condition

**Uses:** As color concentrates for use in coloring polyethylene.

**Features:** Colorants feature batch-to-batch uniformity. When used as recommended, they will give polyethylene products whose colors will be stable under any production and end-use condition.

**Description:** Series of granular color concentrates come in white, yellow, orange, red, green, blue, black, and metallic. They are divided into two groups: one is recommended for use in both masstone and tints under processing temperatures as high as 600°F. Second group is for use where temperatures are less than 425°F.

(Series "PE" color concentrates are products of Claremont Pigment Dispersion Corp., Dept. CP, 39 Powerhouse Rd., Roslyn Heights, L.I., N.Y. . . . or for more information check 7374 on form opposite last page.)

### Light stabilizer for vinyl packs three times the effectiveness . . .

four-part system has undergone extensive testing, has favorable cost picture

**Uses:** As a light-stabilizing system for PVC.

**Features:** Tests show that stabilization provides approximately three times the outdoor durability against light than has heretofore been obtainable in vinyl plastic. Cost picture looks favorable.

**Description:** Four-part stabilizer system consists of these components:

	phr
Ba-Cd mixture	2
Epoxidized soybean oil	3
Antioxidant	0.1-0.75
Organic additive	0.1-2.0

Light stabilization is impaired by omitting any one of the parts.

In outdoor accelerated tests in the Atlas Fadeometer, transparent plasticized formulations of PVC (Opalon 300) in 40 mil thickness were compared. Control samples exhibited a light stability of 1000-1700 hr, latter figure for those standard excellent formulations preferred for optimum light stability. Test samples that contained the recently-developed, light-stabilizing system exhibited stability in the range of 3600-5600 hr, which correspond to the range of performance exhibited



Joseph R. Darby, group leader in charge of plasticizer application research, checks light stability of samples in the Atlas Fade-O-meter

by the varying quality of the control samples. Outdoor tests that are underway indicate that this system triples the best obtainable performance from control and commercial formulations of comparable quality.

Company does not produce or sell stabilizers, but has made patent application on the system. All components are commercially available, however, and at a cost only slightly higher than present stabilization systems.

(Stabilization system for PVC is a development of Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 1700 S. Second St., St. Louis 4, Mo. . . or for more information check 7375 on form opposite last page.)



"Downey, let's see our process accountants figure this one out!"

Credit this cartoon to Allan Kapkowski, Esso Standard Oil Co., Bayway Refinery, Linden, N. J.

## Chemical Processors: Raymond invites you to explore the unusual properties of our **LAURYL SULFATES\***

**\*PENDIT® WA COSMETIC** (Grade) is the new surface active agent manufactured by Raymond Laboratories, Inc., 20-year specialists in the beauty aids preparation field. The lightest colored sodium lauryl sulfate known, only Raymond guarantees consistent, built-in uniformity.

**The properties of PENDIT WA COSMETIC are unique:** Nowhere else can you get the same viscosity, the same degree of emulsification, and the stability—batch after batch—without detergent variation problems that necessitate constant formula correction. Practically water-white, PENDIT WA COSMETIC is essentially iron free and has a low salt content. Neutral and stable, continuing tests demonstrate unvarying results from lot to lot.

**The uses for PENDIT WA COSMETIC are unlimited:** In industrial emulsions; in the textile field for scouring; in the preparation of liquid and paste cream shampoos; in cosmetic suspensions and emulsions; in liquid dishwashing compositions, car washes and personal cleansing products; in short, wherever a mild but effective detergent and a powerful emulsifier are needed. Three viscosity grades are available: LV (low), MV (medium) and HV (high)—all cosmetically

pure, competitively priced, and obtainable in commercial quantities.

### Raymond ALSO SUPPLIES THESE NEW LAURYL SULFATES

#### \*PENDIT WA-T (Triethanolamine lauryl sulfate)

A clear fluid liquid with low cloud point, outstanding color, foaming, detergency and wetting properties for liquid clear shampoos and foaming hand cleaners.

#### \*PENDIT WA-D (Diethanolamine lauryl sulfate)

A 35% active anionic detergent of pronounced color stability for liquid clear shampoos.

### AN INVITATION FROM Raymond

Consider your chemical processes. Can a high foaming, cosmetic grade sodium lauryl sulfate improve efficiency, better the quality, earn extra savings in time and money, or add sales appeal to your product? A new product data booklet on PENDIT WA COSMETIC is yours for the asking. Product data sheets are also available on PENDIT WA-T and PENDIT WA-D. Our technical staff will be glad to supply you with formulas or formula suggestions, as well as working samples, and work with you on your problems. Drop us a line on the coupon below describing your process or idea. There is no obligation.

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Send complete information on the lauryl sulfates checked below:  
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## DIFFERENT BEHAVIOR PATTERNS



## FOR PV AC HOMOPOLYMER EMULSIONS

National makes nine PV Ac homopolymer emulsions. Each behaves differently—because each differs. Not in chemical composition, but in molecular weight . . . particle size . . . and emulsifier type and content.

The result is specialized properties:

- Increased wet resistance
- Compatibility with borax or dextrines
- Stability to settling
- Easier formulation
- A particular viscosity

—and others to match any need from paper and textile coatings to special binder applications.

These properties cost nothing extra. Why not discuss National's PV Ac homopolymers with one of our Resyn® specialists. Just write. Or call your nearest National office.

### RESIN DIVISION

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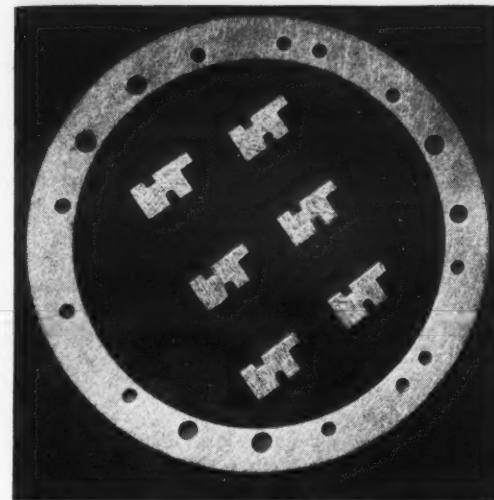
When inquiring check 7377 opposite last page

## MATERIALS

**Polyester/glass mat laminates offer dimensional stability, high impact strength**

**Uses:** For mechanical applications, such as fabricated containers, cams, switchboard panels, spacers.

**Features:** Sheet laminates are dimensionally stable and have very high impact strength, com-



bined with above-average arc resistance. Materials have good chemical resistance to most acids and most solvents.

**Description:** Three grades of polyester resin/glass mat laminates are: GP-9100, a general-purpose, medium-cost sheet with good electrical and mechanical properties; GP-9104, a low-cost grade with lower mechanical properties and fair electrical properties; GP-9202, a flame-resistant grade with best electrical properties, except for arc resistance. Standard sheet sizes are 32x36", 32x48", and 32x74". Colors are tan to cream. Other properties:

	GP-9100	GP-9104	GP-9202
Impact strength (ft-lb/in)			
Lengthwise	11.0	9.0	10.0
Crosswise	10.0	8.0	9.0
Bond strength (lb)	1000	1200	1200
Flex strength (psi, lengthwise)	26,000	20,800	29,800
Dielectric constant (1 mc, condition A)	4.40	4.78	3.97
Arc resistance*	88	96	3
Water absorption (% gain, cond. D-24/23)	0.21	0.31	0.14
Density	1.75	1.82	1.79

\*Figure is for arcs, rather than seconds. Intermittent arc is on 3/4, off 3/4, repeated 112 times/min between two electrodes 3/8" apart with 30 ma current at 15 kv.

**NOTE:** These typical values are for 1/8"-thick laminates

(Sheet laminates are a product of National Vulcanized Fibre Co., Dept. CP, 1056 Beech St., Wilmington 99, Del. Check 7378 opp. last page.)

**Solution adhesive for bonding latex foams is fast drying, strong and flexible . . .**

will also bond polyurethane foam to itself or to fabric or paper

**Uses:** For bonding natural latex and synthetic foams.

**Features:** Adhesive will bond polyurethane to itself or to fabric or paper. It is fast drying and produces a strong, flexible bond. In finished state, adhesive can be made soft like foam rubber, or hard like polystyrene foam. It is odor free.

**Description:** Applied by brush, adhesive is let dry. Bond is formed with pressure, but without heat. Solids content of adhesive is 14%, wt/gal is 6.7 lb. Viscosity is 600 cps. Commercial thinners are not recommended; use Arcco C-518-T.

(Arcco C-518 adhesive is a product of Resinous-Reslac Dept., Chemical Div., The Borden Co., Dept. CP, 103 Foster St., Peabody, Mass. . . or for more information check 7379 on form opposite last page.)

**Maroon pigment resists heat discoloration, is permanent . . .**

is brilliant, non-bleeding, easily dispersed

**Uses:** A maroon pigment for plastics, rubber, and printing inks.

**Features:** Permanence of pigment is exceptional. It has high heat and light resistance. Pigment is brilliant, non-bleeding, and easily dispersed.

**Description:** It is a sulfonated anthraquinone-type pigment.

(Pyrolux Maroon D-3148 is a product of Pigment, Color and Chemical Div., The Sherwin-Williams Co., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . or for more information check 7380 on form opposite last page.)

**Physical and chemical data and uses of tetrahydrofurfuryl alcohol**

Physical data, chemistry, uses, and safety information on QO Tetrahydrofurfuryl alcohol are contained in 28-page monograph. Booklet contains six pages of tables, three of graphs. References total 124.

Bul 206 is issued by The Chemicals Dept., The Quaker Oats Co., Dept. CP, Merchandise Mart Plaza, Chicago 54, Ill. When inquiring specify 7381 on form opposite last page.

**For You Catalyst "Know-How"**

What makes one catalyst superior to another? Often it is the unseen ingredient, "know-how". Davison's long experience in successful catalyst production gives you this all-important element.

Davison, the first commercial producer of synthetic petroleum cracking catalysts, operates a modern plant for the sole purpose of producing specialty catalysts to aid industrial chemical progress. These catalysts can be custom made to your specifications. We guard your "know-how" as carefully as we do our own. They are made in many forms including granular, pelleted, powdered, spherical, extruded and include many supports and active agents.

Put Davison's "know-how" to work on your problem. No matter what your catalyst requirements are, it will pay you to discuss them with the Davison Field Service Engineer. A free booklet on Davison dependable catalysts is available on request.

**DAVISON CHEMICAL COMPANY**  
 Division of W. R. Grace & Co.  
 Baltimore 3, Maryland

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Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides.  
 Sole Producers of DAVCO® Granulated Fertilizer.

When inquiring check 7382 opposite last page



# ALUNDUM\* catalyst carriers benefit a wide range of processing

Norton ALUNDUM (fused alumina) catalyst carriers are characterized by excellent mechanical, thermal and chemical stability. They have high resistance to abrasion and erosion, and their low density is useful for packing and

filling applications. Catalytically, they are crystalline in nature and are produced in two surface area types: low and intermediate. Intermediate surface area carriers are subdivided into types A, B, C, with varying characteristics.

TYPICAL CHEMICAL ANALYSES (%'s)			PHYSICAL PROPERTIES						
	LOW SURFACE AREA	INTERMEDIATE SURFACE AREA		Porosity	Water Absorption	Bulk Density	Vol. Bulk Density	Crystal Structure	Surface Area
Al <sub>2</sub> O <sub>3</sub>	89.4-76.6	77.0	Low Surface Area	40-50%	20-25%	1.90-2.10 gr/cc	65-80 lbs/ft <sup>3</sup>	Alpha Alumina	Less than 1m <sup>2</sup> /gram
SiO <sub>2</sub>	9.3-16.8	21.2	Intermediate Surface Area Type A	50-55%	28-30%	1.65-1.70 gr/cc	58 lbs/ft <sup>3</sup> (app)	Alpha, Gamma Alumina-chiefly Gamma	60-70m <sup>2</sup> /gram
Fe <sub>2</sub> O <sub>3</sub>	0.5-1.3	0.2							
MgO	0.1-0.6	0.4	Type B	50-55%	28-30%	1.65-1.70 gr/cc	60 lbs/ft <sup>3</sup> (app)	Quartz, Alpha, Kappa, Delta Alumina-chiefly Quartz	20-30m <sup>2</sup> /gram
CaO	0.1-0.8	0.5							
Na <sub>2</sub> O	0.3-0.4	0.2	Type C	50-55%	28-30%	1.65-1.70 gr/cc	62 lbs/ft <sup>3</sup> (app)	Alpha Alumina and Mullite	5-10m <sup>2</sup> /gram
K <sub>2</sub> O	0.1-1.0	0.2							
TiO <sub>2</sub>	0.2-2.5	0.5							

## Shapes and Sizes

Spheres: (Low surface area)  $\frac{3}{16}$ "-1" diam.; (Intermediate surface area)  $\frac{1}{4}$ "- $\frac{1}{2}$ " diam. Pellets: (All carriers)  $\frac{1}{8}$ " x  $\frac{1}{8}$ " -  $\frac{1}{2}$ " x  $\frac{1}{2}$ ". Rings: (All carriers)  $\frac{1}{8}$ " x  $\frac{1}{4}$ " x  $\frac{3}{8}$ " O.D. - 1" x 1 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " O.D.

## Typical Applications

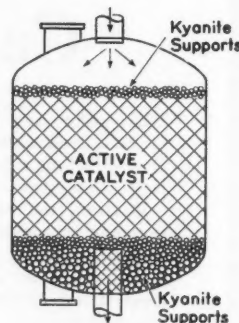
**Low Surface Area Carriers:** phthalic anhydride, maleic anhydride, ethylene oxide, protective atmospheres, synthetic gas generation, grates or suspending beds for active catalysts.

**Intermediate Surface Area Carriers:**

catalytic reforming, dehydrogenation, dehydration, sulfuric acid manufacture, nitric acid manufacture, dessicants.

## In Suspending Beds For Active Catalysts

In addition to the carriers described here, Norton produces catalyst supports for use in fixed bed converters where it is necessary to suspend active catalysts at a given level. Made of dense, rugged, chemically inert Kyanite material, these supports have great resistance to breakdown and have no chemically reactive effect on the processing.



## Get More Facts

on how ALUNDUM catalyst carriers and Kyanite supports can improve and economize your processing. Call in your Norton Refractories Engineer or write, mentioning your requirements, to NORTON COMPANY, 568 New Bond St., Worcester 6, Mass. Canadian Representative: A. P. Green Fire Brick Co., Ltd., Toronto 5, Ontario.

## MATERIALS

### Gives pointers on stabilizing plastic compositions with metallic soaps

Metallic soaps (i.e.: water-insoluble soaps) are used in the plastics industry as heat and light stabilizers and as lubricants. The various metals and fatty acid portions of the soaps impart specific qualities. These are discussed here.

Al, Ba, Ca, and Zn stearates are added to thermosettings and thermoplastics in small amounts (0.5%) to lubricate the granules as they are being molded. These soaps are incompatible with the plastic and migrate to the surface to function also as a mold release agent.

Polyvinyl resin compositions are compounded at 300-400°F. They are very sensitive to heat and light, which cause liberation of HCl. This forms highly conjugated, unsaturated structures which are colored and also tend to cross-link. These polyene structures catalyze further liberation of HCl, which darkens and embrittles the plastic. Ca, Ba, Pb, and Cd soaps of stearic, palmitic, lauric, ethyl hexoic, naphthenic, or ricinoleic acid are used alone or as mixtures to counteract this.

A non-toxic stabilizer is calcium stearate. Because its action is very mild, especially above 300°F, small amounts of Ba, Li, Mg, or Zn soaps are added to improve it.

A synergistic combination of Ba-Cd laurates gives good heat and light resistance and good clarity. Their slight yellow staining and good lubricity may be objectionable. Lubricity can be reduced by using epoxy compounds and chelating agents, or soaps of shorter chain fatty acids.

In plastisol milling, lubrication is desirable, but too much causes soaps to migrate to surface and plate out on the rolls, causing stock to lose traction and slip off. Soaps of less saturated or short-chain length fatty acids will help. Soaps of the stearates, palmitates, and laurates may also cause excessive thickening. The same solution works here too, and also gives improved printing and heat sealing characteristics to the vinyl film.

Information courtesy of F.J. Licata, Technical Director, Metasap Chemical Co., a Div. of Nopco Chemical Co., Inc., Dept. CP, Harrison, N.J.

- \* Why the "distinctive" size of CHEMICAL PROCESSING?
- \* Why its "different" editorial treatment?
- \* How do these help the reader?

See explanatory letter from the Editors on page 100.

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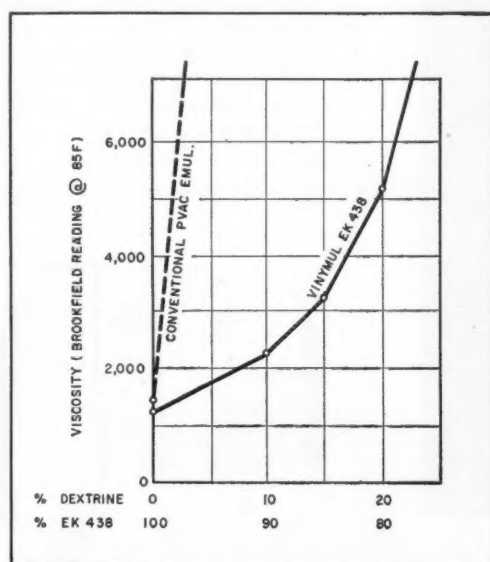
### Dextrine-compatible polyvinyl acetate emulsion maintains smooth body in gums . . .

also offered are custom PVAc resin polymers in aqueous dispersion

**Uses:** Dextrine-compatible PVAc emulsion was developed for the gumming trade.

**Features:** Emulsion is dextrine-compatible and will tolerate low- or high-soluble dextrines in all proportions. As chart shows, emulsion can be blended with dextrine in large or small amounts, without excessive viscosity buildup.

**Description:** This polyvinyl acetate emulsion has been designated Vinylmul EK-438. Dextrine



Compatible emulsion (EK-438) shows viscosity build-up as dextrine is added. Dashed line (left) suggests incompatibility of conventional emulsion

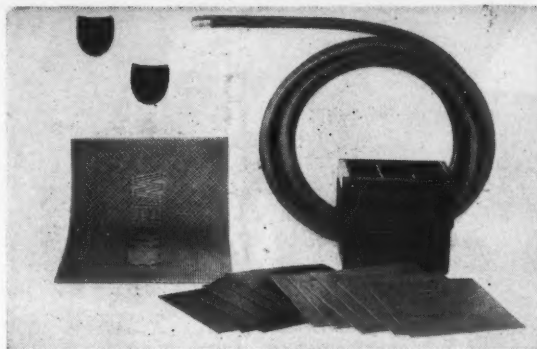
can be added to the emulsion as a solution, or can be cooked directly with it.

#### Custom PVAc Emulsions

Custom polymers of vinyl acetate resin in aqueous dispersion are also offered in large quantity. Called Vinylmuls, the possible range and variety of the emulsions is almost limitless, manufacturer states. The emulsions can be used for compounding stable, fast-setting, resin-based adhesives and for making water-resistant coatings, textile finishes, and as a vehicle for water-base paints. Impregnation and sizing work are also indicated uses.

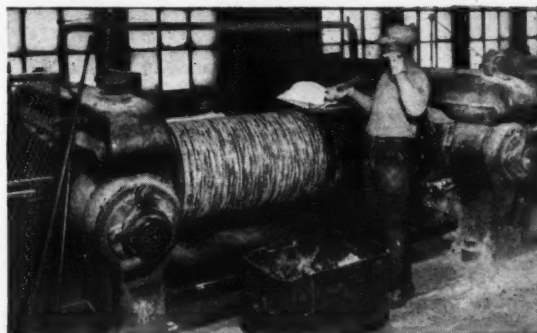
(Vinylmuls are products of Paisley Products, Inc., Div. of Morningstar, Nicol, Inc., Dept. CP, 630 W. 51st St., New York 19, N.Y. . . . or for more information reader may simply check 7384 on the convenient Reader Service slip which is located opposite last page.)

## New polymer offers rubber industry important improvements



**Properties of A-C\* POLYETHYLENE** — Tests in laboratories and by commercial operators show that low-molecular-weight, low-viscosity A-C POLYETHYLENE has solved many problems in rubber processing. A-C POLYETHYLENE, available in pellet and powder form, is easy to handle in your plant equipment. Emulsifiable grades are also available.

**Shrinkage Greatly Reduced** — Addition of A-C POLYETHYLENE to milled stocks can sharply reduce shrinkage, permitting adherence to closer dimensional tolerances. In one case, shrinkage of a synthetic formulation was reduced by 75%.



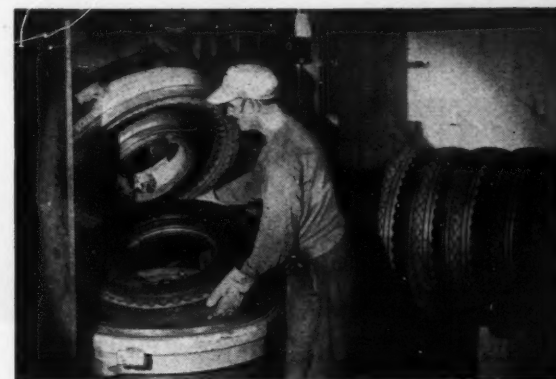
**Excellent Detackifying Properties** — A-C POLYETHYLENE is a superior detackifying agent, especially at elevated Banbury, mill and calender temperatures of 200°F. and higher. This property is

# AC Polyethylene

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particularly valuable when compounding synthetics. It has demonstrated exceptional qualities as a mold release; as a lubricant it allows higher operational speeds.

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**Information and Samples Available** — Preliminary technical data is available in an eight-page brochure. Samples of A-C POLYETHYLENE are also yours for the asking.



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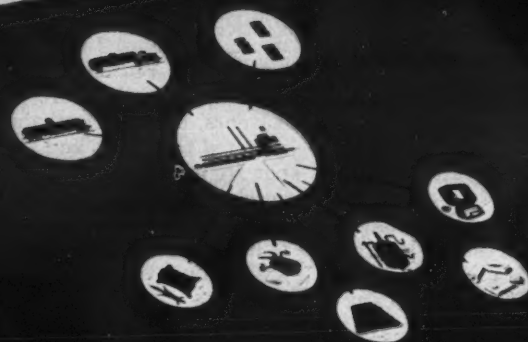
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(Alpha Olefin is a product of Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 2191 W. 110th St., Cleveland 2, Ohio . . . or for more information check 7386 on form opposite last page.)



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(Believe it or not, this really happened in the personnel offices of a large mid-western processor!)

For more information on product at left, specify 7387 . . . see information request blank opposite last page.

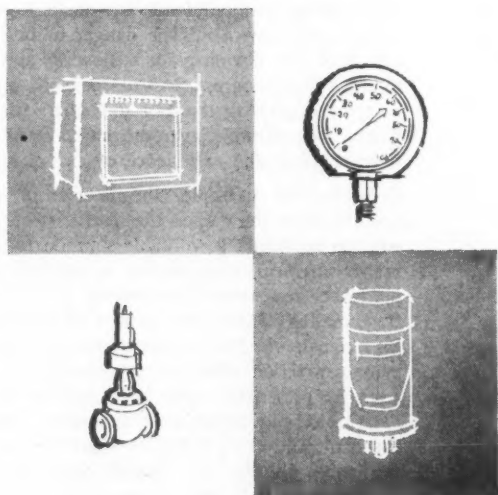
*This month*

## CHEMICAL PROCESSING

*spotlights*

*its regular section on*

# instrumentation



- ▶ Education and Instrumentation — by Bob Sheen ..... 54
- ▶ Ultrasonic testing keeps boilers safe ..... 56
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- ▶ Quick pressure conversion nomograph ..... 82



A real and growing problem of chemical industry is the technical manpower shortage. At present there is a shortage of 82,000\* technical people and by 1965 there will be 93,000\* less technical people than needed by the chemical industry alone. Two approaches to solving this problem are apparent in . . .

## EDUCATION and INSTRUMENTATION

**ROBERT T. SHEEN, President**  
Instrument Society of America



*Robert T. Sheen graduated from Lehigh University, B.S., Ch.E., in 1931. Prior to forming Milton Roy Company, he was associated with Monsanto and with W. H. and L. D. Betz.*

*Mr. Sheen is also founder and Chairman of the Board of Chemical Pump and Equipment Corp., and co-founder and President of Chem-pump. He is a registered professional engineer.*

*He is a member of ACS, AIChE, National Society of Professional Engineers and other technical societies. He has written over 30 technical publications and holds a number of patents on chemical pumps and automatic chemical feed systems.*

*Currently President of the Instrument Society of America, he has also served ISA in the past as National Vice-president, National Secretary and President of the Philadelphia Section.*

**T**HE SHORTAGE of technically trained manpower which confronts us is a challenge to effective employment of industrial plants. Long range aspects are a threat to an economically and technologically healthy America.

This scarcity of manpower dictates the need for efficient use of human effort, to increase the average output of goods or services by individual workers and to insure continued production of high quality products at minimum costs. Toward this end, industry relies, at an accelerating rate, on the science of instrumentation. To realize the maximum benefit from instruments, however, we must have trained personnel to design and build this equipment — to install, operate and service it. The danger in failing to fill this need lies obviously in a slowing down of our technological progress. Instrumentation, certainly, is a factor in making the best immediate use of manpower, but effective instrumentation itself calls for technical skill and experience of a very high order.

Consider, for example, the instrument engineer's task. He must draw upon the reservoirs of all knowledge to synthesize a workable solution to a problem in measurement, computation or control. Assuming he wants to control temperature at the top of a fractionating column, he needs a control instrument. In a dynamic sense, the controller will take a compensatory action whenever the temperature deviates from its prescribed value. The instrument engineer must select an appropriate controller, matched to the plant and the process, to effect the desired performance. Ideally, he should know the dynamic characteristics of the plant-process complex; he should know the nature of various modes of control — proportional, rate, reset, their combinations and interactions — and armed with this understanding, attack the problem of instrument selection with success.

\*According to figures recently announced by the Manufacturing Chemists' Association, Inc.

A limited understanding of the dynamic behavior of the process and plant, however, can result in difficulty in selection of the optimum controller for any given conditions. Or, when the process is in the planning stage, it may be over designed for safety, thereby resulting in storage capacities that are excessive, and throughput considerably less than theoretically possible. The result, of course, is something short of the desired efficiency in terms of capital investment and manpower investment alike.

Instrument selection is not the only problem. The instrument engineer, the process designer and the operations manager are also equally concerned with the determination of the prescribed point about which control action is to take place. Out of experience, out of pilot plant operation, out of balance sheet analyses, there gradually emerges a "preferred" combination of instrument set points. The prescription of optimum controller set points, however, is a static problem, mathematically speaking. Some plants have calculated optimum set point data, but not enough have resorted to this technique. And yet, from the wealth of operation data available in plants, it is a relatively simple matter to make up tables or nomographs showing optimum combinations corresponding to different products, raw materials, etc. Techniques exist to furnish operating crews, their supervisors and plant management with the information they need to select the best controller, the best set point, the best production schedule. The need is for this information to be communicated in a manner in which it can be easily assimilated.

#### Education and ISA

These examples illustrate, in part, the wide-spread need that exists for continuous education of technical people. In the field of instrumentation, the Instrument Society of America (ISA) has been engaged in this fundamentally important work since 1946. Through its Education and Society structure and Planning committees, ISA has been developing a comprehensive program to help fill the industry-wide need for instrumentation education and research. This effort has crystallized with the proposed formation of a Foundation for Instrumentation Education and Research, a non-profit corporation with the objective "to stimulate, guide and support programs of education and fundamental research in the field of instrumentation." Plans and programs for the Foundation will be publicized at a later date.

Part of the continuing effort in the broad field of education has been the instrumentation and automation conferences and exhibits sponsored by ISA each year. This year the 11th Annual Conference and Exhibit will convene in the New York City Coliseum during the period September 17 to 21, providing instrument users and manufacturers with the opportunity to communicate — and to learn more about each other's needs and problems. We hope to see you there.

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*Write for Bulletin '108'*

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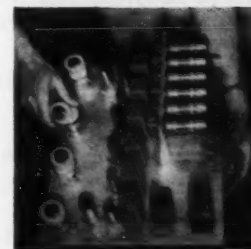
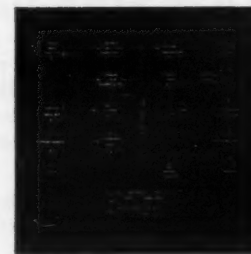
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*New York 16, N. Y.*

*Murray Hill 3-6030*

Qualified persons are invited to view this equipment at our New York Laboratory during the week of the I.S.A. Show. Write or call for further information.



When inquiring check 7388 opposite last page

Cracks and weak spots in water tubes of a 1000-psi boiler spelled trouble for Carbide's Whiting, Indiana, plant. By using ultrasonic inspection, Carbide & Carbon . . .

## keeps boilers safe with minimum downtime



**BRUCE FADER**, Associate Editor  
With **FRANK C. PARKER**, Senior Engineer  
Non-destructive Testing  
Carbide & Carbon Chemicals Company  
South Charleston, W. Va.

**Problem:** At Whiting, Indiana, Carbide has three high-pressure boilers, these operating at 1000 psi, 780°F, and producing 130,000 pounds of steam each per hour. In 1953 it looked as though entire power unit would have to be shut down with high production losses.

Inspection of waterwall headers in these three boilers indicated severe surface cracking. Material

was 12 $\frac{3}{4}$ " OD low carbon steel 1.219 inches thick. Though this material was standard in the application, observed flame temperatures of 3200°F produced decided fire-checking in two years of service. While conventional thickness checks could be made by shutting down the boiler completely and testing thickness, this would have disrupted production. Still, Carbide would not permit the unit to be operated at full rating so long as a question of safety arose.

When the first fire checking appeared, it was thought to be superficial. Headers were covered with a smooth brown oxide film cracked in a pattern resembling weathered paint. Boilers were shut down, surface was ground off to 1/32 of an

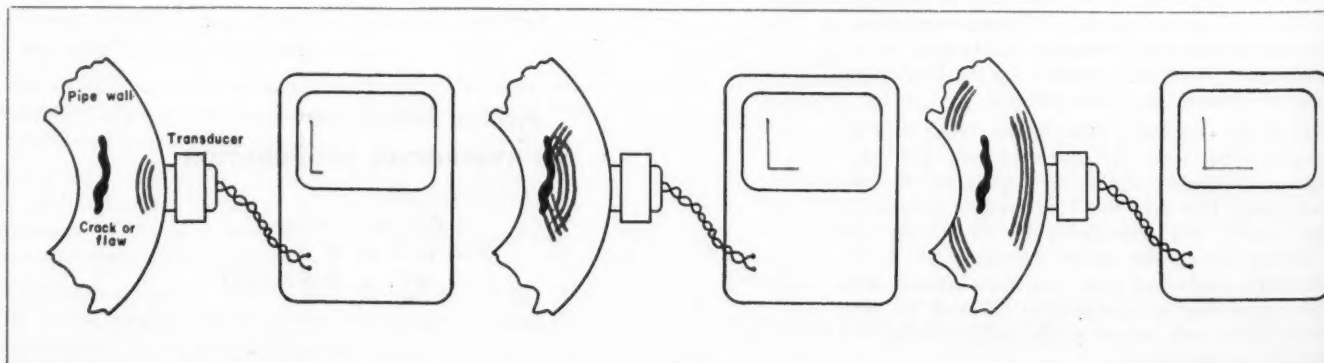
inch and metal appeared to be sound. Further checks were not made at this time. Instead, studs were spot-welded to these headers to secure a refractory protective coating. It was believed that this would prevent any further damage.

Six months later, boilers were shut down again and studs were chipped off. Fig 1 shows condition of the header at this stage. A badly etched condition was found at the hottest flame region on each header.

**Solution:** This time, ultrasonics were used to determine whether this "etching" was a surface condition or cracks in the tube wall. When a portable unit was taken into the boiler, examination showed that these were actually circumferential

### HOW ULTRASONIC INSPECTION WORKS

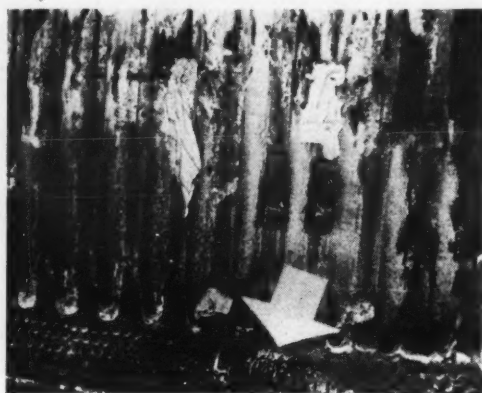
High frequency sound waves enter pipe wall from transducer. These waves travel through pipe wall and are reflected from flaws, cracks, bolt holes, or surfaces of the test piece. Reflections re-entering the transducer cause "pips" to appear on the instrument scope





Tube failure was averted in these boilers at Carbide's Whiting plant by non-destructive testing

Studs were spot welded to header in order to secure refractory coating. When studs were ground away (arrow) during inspection, cracks were evident in tube wall



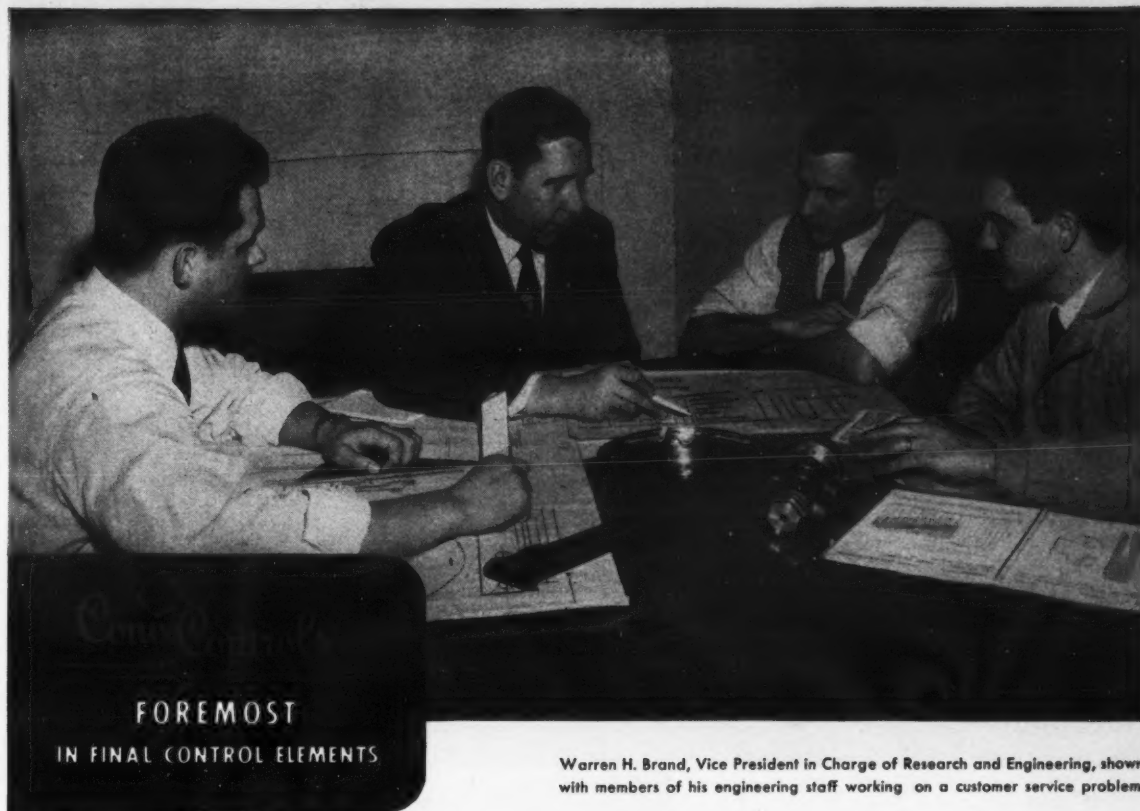
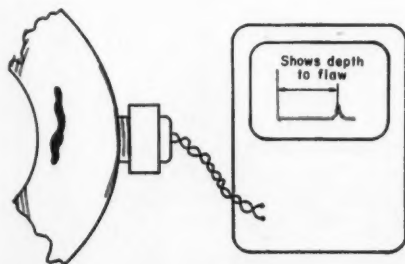
cracks up to  $\frac{3}{4}$  of an inch deep in the original 1.219 inch wall. There were ten or more cracks per inch up to four inches in length.

A portion of one header was chipped out to a depth of  $\frac{1}{2}$ -inch to verify ultrasonic indications — cracks existed as ultrasonic inspection had indicated.

Thickness test was made by beaming pulses of ultrasonic sound waves into the wall. These "shear" waves are reflected from discontinuities and show location of the flaws by a trace on a cathode-ray tube. Depth of the cracks was determined by moving the transducer.

Another important application of ultrasonics to

(Please turn to page 64)



FOREMOST  
IN FINAL CONTROL ELEMENTS

Warren H. Brand, Vice President in Charge of Research and Engineering, shown with members of his engineering staff working on a customer service problem.

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# VIBRATION



## Vibration of refinery compressor proves unshakable accuracy of RMC thermometer

The RMC Thermometer shown in the photograph is constantly subjected to extreme vibration from the two-stage Synthesis Gas Compressor on which it is installed. This powerful equipment is used to compress a mixture of  $H_2$  and  $N_2$  from 400 to 3500 pounds—at the Philadelphia Synthetic Ammonia Plant of The Atlantic Refining Company.

This particular job required a special thermometer that could withstand the constant and terrific vibration, and at the same time provide and maintain precise, accurate readings. Rochester Manufacturing Company promptly came up with the answer—a silicone-dampened, bimetallic, angle-form RMC thermometer. And this is but one example of how RMC engineering skill provides instruments that meet the most demanding and exacting requirements.

### Look to RMC for Full-Line Instrumentation



#### DIAL THERMOMETERS

Illustrated here is a 6" dial thermometer with hermetically sealed dial chamber, external recalibration—built for heavy duty service. What are your thermometer requirements?

#### PRESSURE SWITCHES

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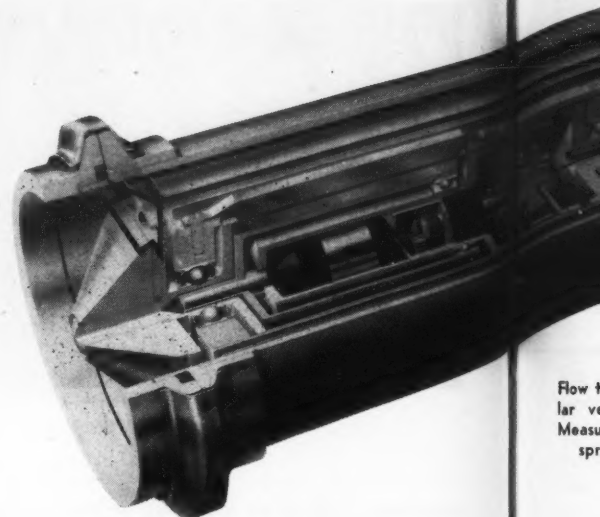
© 1956 Rochester Manufacturing Co., Inc.

When inquiring check 7390 opposite last page

## INSTRUMENTATION & CONTROL

### CONVERTS INERTIAL MASS

... does tricky jobs like measuring amount of froth in oil, amount of liquid water in steam line



**Uses:** As flow meter for measuring liquid or gas volume and providing rate-of-flow indication directly in gallons or pounds. Can be used in feed-back applications for process control.

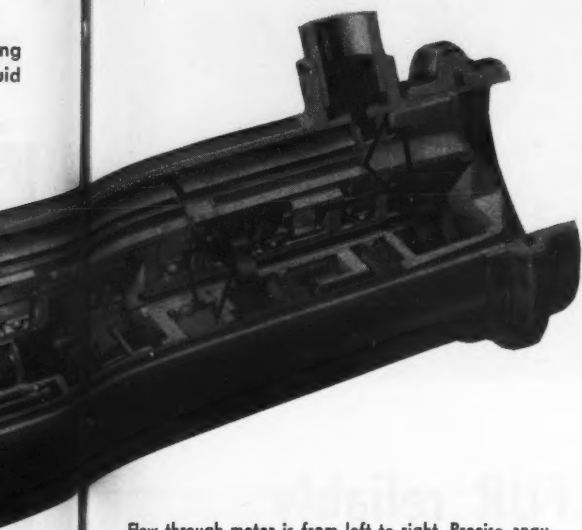
**Features:** Inertial mass flowmeter weighs liquid or gas directly. Accuracy is not affected by pulsating flow, location of meter in line, or volume changes caused by temperature.

**Description:** Liquid or gas is measured continuously by flowmeter. Upon entering meter, material is given precise angular velocity by impeller. Then a "measuring turbine" subdues this velocity completely. Since original angular acceleration is constant and known, torque necessary to subdue liquid's velocity measures mass that was accelerated — the "mass flow".

Torque of measuring turbine activates calibrated spring made of Ni-Span C. Spring's deflection is converted into an electrical signal by an output transducer. Signal registers on a dial indicator, a digital counter, and a totalizer — if desired. Through use of Ni-Span C, transducer assembly's overall thermoelastic coefficient has been held to 50 ppm/degree F. That of the spring is less.

In developing flow meter, engineers found key to problem of special stable-frequency power supply formerly considered essential in device of this

## ASS FLOW INTO WEIGHT

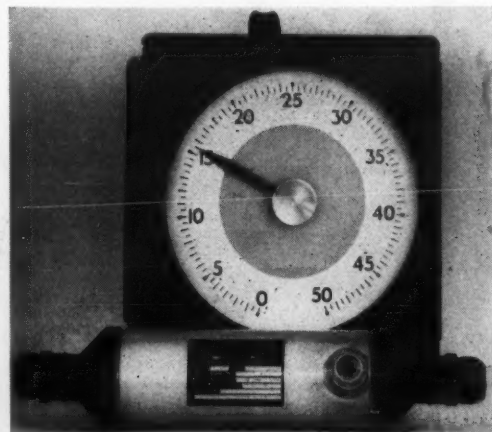


Flow through meter is from left to right. Precise angular velocity is supplied by impeller (left arrow). Measuring turbine (right arrow) activates calibration spring (arrow lower right). Drive motor is center

kind. Solution was development of a centrifugal governor consisting mainly of two Ni-Span C springs. Governor holds speed of flowmeter's drive motor constant within  $\pm 0.25\%$ , regardless of changes in line voltage, frequency, and ambient or liquid temperature.

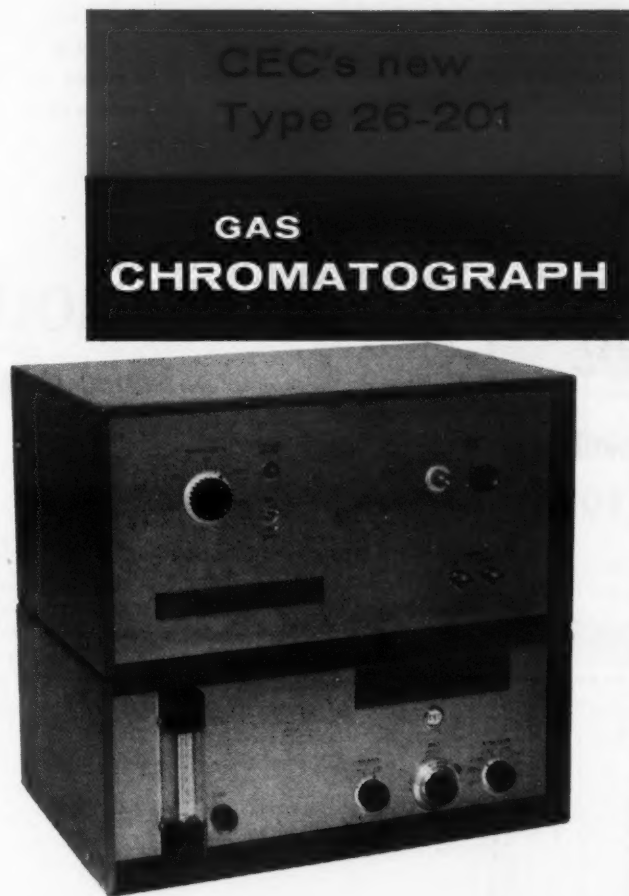
Originally developed for use in jet engine and missile fuel systems, flowmeter handles such tricky

(Please turn to page 63)



Flow meter and indicator

announcing...



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300 North Sierra Madre Villa, Pasadena, California

ELECTRONIC INSTRUMENTS FOR MEASUREMENT AND CONTROL

COMPANY-OWNED SALES AND SERVICE OFFICES THROUGHOUT THE UNITED STATES

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Already hailed as the greatest analytical development in the past 10 or 20 years, gas chromatography gains new flexibility, wider range, and greater precision with CEC's new Type 26-201 Gas Chromatograph. Modular design makes it possible to buy the exact type and size system you need, then expand it with minimum additional investment as your analytical needs change. Several analyzer units may be operated from a single control unit, and since each analyzer's temperature may be independently set, change-over time is cut to a minimum, and over-all system speed remains high.

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**MODULAR DESIGN**... expandable as analytical needs change; columns easily interchanged; quick change-over between analyzer units and central control unit.

**WIDE TEMPERATURE RANGE**... temperature of the analyzer continuously adjustable from  $60^{\circ}\text{C}$  to as high as  $250^{\circ}\text{C}$ , and regulated to within  $0.5^{\circ}\text{C}$ .

**HIGH REPRODUCIBILITY**... internal sample valve, heated to the temperature of the analyzer, controls size of gas samples within  $\pm 0.5\%$ .

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**SMALL SAMPLES**... microsamples make instrument valuable in research applications.

**VERSATILE**... operates with either absorption or partition columns to handle wide variety of compounds.





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Dependable  
as the Pull of a  
**MAGNET!**

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Ever Devised!

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## Instrumentation & control

Close-up of meter shows steam connections from pipe jacket to meter jacket. Note "neck" extension which keeps meter face away from hot line

One headache in sulfuric acid production is measuring the amount of sulfur fed to burners so that efficiency of the process can be checked. U. S. Rubber, operator of the Kankakee Unit of Joliet Arsenal, Joliet, Illinois . . .



U. S. Army photographs

## meters **MOLTEN SULFUR** reliably ... using steam-jacketed nutating-disc meter

BRUCE FADER, Associate Editor

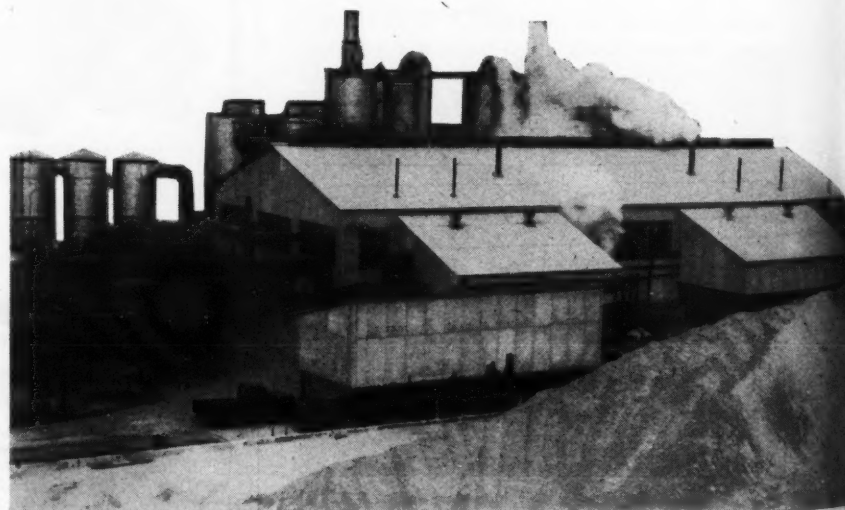
**Problem:** Like most sulfuric acid plants, the Kankakee Unit of Joliet Arsenal near Joliet, Illinois, did not have much trouble inventorying sulfur on hand or production of finished sulfuric and oleum. But checks of sulfur fed to the process and corresponding amount of acid produced was difficult information to get. This information, of

course, was needed by the operating contractor (U.S. Rubber Co.) to, determine efficiency of conversion.

At one time U. S. Rubber tried weighing sulfur into the burner. This time-consuming procedure was not economical and was abandoned.

**Solution:** A steam-jacketed nutating-disc meter was installed on a 3/4-inch steam-jacketed pipeline carrying molten sulfur to the burner. This instru-

General view of sulfuric acid plant—raw sulfur is stockpiled in foreground



When inquiring check 7392 opposite last page



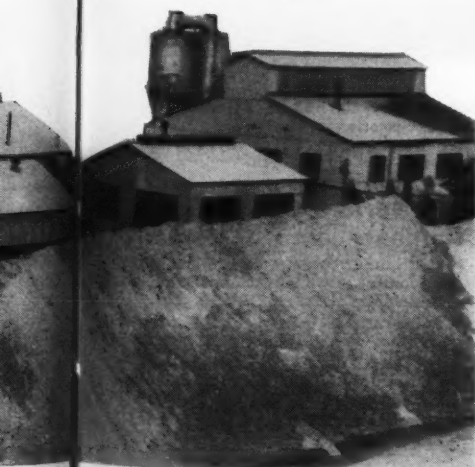
Molten-sulfur meter is installed in line in front of sulfur burner

ment was satisfactory while it worked, but operating conditions took it out of service before it had proved its value.

Three factors were blamed for this failure. First, meter was mounted in a run of  $\frac{3}{4}$ -inch pipe and had no supplementary support. Vibrations, normal to this particular operation, were intensified by the pipe and damaged the meter. A second condition — a tendency on the part of the meter to freeze up with solidified sulfur — did not help. Third, originally the sulfur was not neutralized nor was it filtered. When the meter was taken out of service, it was found that internal mechanisms had been badly chewed up.

When this meter was replaced (in April of 1955),

*(Please turn to next page)*

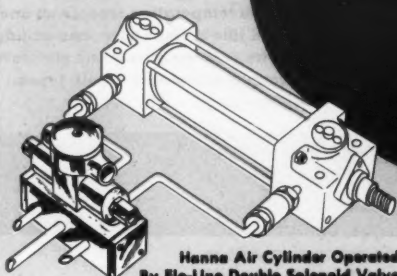


THEY'RE

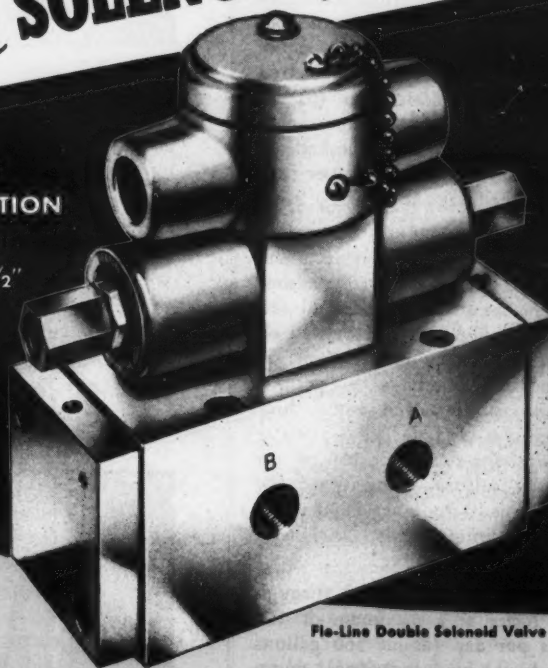
**NEW!**

# HANNA Flo-Line SOLENOID VALVES

4-WAY VALVES  
FOR AIR OPERATION  
UP TO 150 PSI  
SIZES:  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ "



Hanna Air Cylinder Operated  
By Flo-Line Double Solenoid Valve  
With Flo-Sol Speed Control Valves



Flo-Line Double Solenoid Valve

Hanna has designed and built new and unusual features in their Flo-Line Solenoid Valves... features that result in economy, more versatile operation and safety. Here are some of them:

- Bubble Tight Spool positively sealed by "O" rings.
- Dust-Tight, Splash-Proof Design to seal out dirt and moisture, and assure trouble free performance.
- Few Moving Parts for longer valve life.
- Full Pipe Capacity for all internal passages.
- Wide Range of Temperatures and Pressures —40° F. to 125° F.; 20 to 150 psi air. Options permit air pressure to 250 psi and even vacuum!
- Enclosed Solenoid Coils for safe operation.
- AC or DC Service, coils are available for most voltages and frequencies.
- Meets JIC Recommendations in all respects when ordered with optional manual over-ride.
- Side or Manifold Porting for easy installation and convenient piping.
- Choice of Spools permits selection of a standard valve for most applications.
- Manual Over-ride, an optional feature, allows equipment to be tested before final electrical installations are made and provides a means of operating the valve in case of electrical failure.
- Junction Box for ease in making electrical connections.
- Modern Clean Cut Appearance

You'll surely want the complete details given in the new Hanna Flo-Line Catalog No. 261. See your classified telephone directory or Thomas' Register for the name of your nearest Hanna Representative—or write us direct.



## Hanna Engineering Works

HYDRAULIC AND PNEUMATIC EQUIPMENT • CYLINDERS AND VALVES  
1744 N. Elston Ave., Chicago 22, Illinois

When inquiring check 7393 opposite last page



## Molten Sulfur Meter

(Continued from preceding page)

an upstream filter was installed to prevent abrasives from getting to the meter. Lime neutralization of the molten sulfur was also begun. The second meter was bolted to a concrete foundation so that it could not vibrate. Steam tracing and jacketing was checked to make sure that the meter was maintained at about 270°F in operation.

Casing of the meter is iron and working parts are 316 stainless except for cast-iron disc and carbon ball. Register is mounted on an extension to elevate it eight inches above body — this permits good visibility even when thick lagging is used. Jacket is rated at 100 psi for steam (or 150 psi for molten sulfur). Capacity of the meter is rated at 2000 gph, though intermittent 3000 gph operation is possible.

Molten sulfur is forced through the meter at a maximum of 100 tons per day (about 560 gallons per hour) by a centrifugal pump powered by steam turbine.

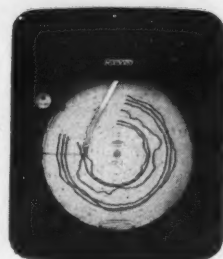
**Results:** Since installation of the second meter in April of 1955, it has been in almost continuous service. During that time about 2,000,000 gallons (30,000,000 pounds) of molten Louisiana dark sulfur have been run through the meter. Meter has required no maintenance so far. Readings taken every 24 hours (sometimes every shift) indicate that while there can be no close check on accuracy of the meter because there is no standard of comparison, results are reasonable and consistent.

Most important, management now feels that for the first time they are getting accurate information on the actual quantities of raw materials used, and can make exact and money-saving evaluations of production processes.

(Molten-sulfur meter is a product of Buffalo Meter Co., Dept. CP, 2917 Main St., Buffalo, N. Y. . . . or for more information check 7394 on Reader Service slip which is located opposite last page.)

# GET THE BEST SOLUTION TO ANY TEMPERATURE PROBLEM

with Foxboro Instruments

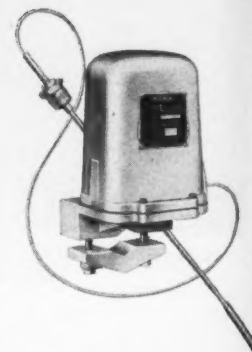


## Dynalog Electronic Instruments

Complete line of indicators, recorders, and controllers employing the advanced Dynalog measuring system in which a friction-free air capacitor replaces conventional slide-wire — provides continuous, stepless balancing action. Dynalog Instruments provide up to six records on a single round chart. For use with resistance or voltage type primary elements — pneumatic or electric control action.

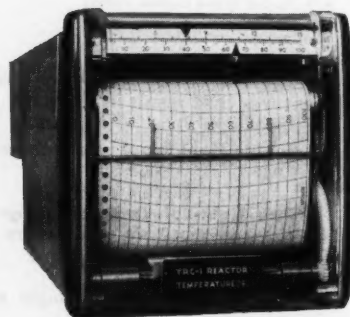
### Multi-Record Dynalog

- 6 color-coded temperature records on one round chart.
- Each record line a distinctive, non-smudging color.
- No slidewire — no batteries — no standardizing.
- Thermocouple or resistance bulb types.



## Model Pneumatic

- Simple operation — range 200°.
- Compact size.
- Compact size — no capillary.
- Suitable for outdoor use.



## Consotrol Recording Control Station

One of the complete Consotrol line of compact panel indicators, recorders, and controllers. This advanced control station features full 4" chart and scales, six-months' ink supply, bumpless auto-man. transfers. The M/58 Consotrol Controller, shown here integrally mounted, provides:

- All four control actions, with two reset ranges, easily adjustable to widest variations in operating conditions.
- Easy lever-setting proportional band, calibrated to 500%.
- High sensitivity and precision due to unique "floating disc" balancing action — even at widest settings of proportional band.
- Interchangeable "plug-in" components.
- Continuously variable reset resistance gives 500:1 rangeability.

## PRIMARY ELEMENTS

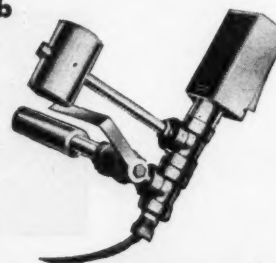
A complete selection of primary elements for filled thermal systems, resistance bulbs, and thermocouples. Besides standard and thermocouple types, special elements and accessories are available to meet the requirements of virtually any industrial application.



### Dynatherm Resistance Bulb

For use with Dynalog Electronic Instruments.

- Superior measurement performance for temperature up to 600°F.
- Fastest response due to positive metal-to-metal end contact with standard wells or sockets.
- Highest sustained accuracy. Permits use of extra-narrow scales — ideal for precise temperature difference measurements.



### Roll Surface Temperature Element

- Continuous, automatic measurement or control of roll surface temperatures up to 450°F.
- Extra-rugged construction — with a "leather" touch. Won't mark or score the roll.
- Eliminates friction, radiation, and convection errors.
- Simplest, most accurate way to measure roll surface temperatures.



from -450°F  
to +2800°F

### Model 12A Temperature Pneumatic Transmitter

- Simple way to measure remote temperatures in the -100°F to +1000°F range. Operating spans of 50°, 100°, 200°, and 400°F.
- Compensated for ambient temperatures and pressures.
- Compact, easily installed. Uses regular 1/4" O.D. tubing transmission lines — no troublesome conduits, no costly capillary tubing.
- Suitable for any hazardous, corrosive, or outdoor location.

### Electric Proportional Action Controller

- Can be used with any Foxboro measuring system — mechanical or electrical.
- Precise, frictionless control action through electronic relay and electric valve operator.
- 3 types of proportional control action available.
- Setting knob permits easy, stepless adjustment of control band throughout range of instrument.

Whenever you have a temperature problem in the -450°F to +2800°F range, you can depend on Foxboro Instrumentation for the best solution. Foxboro's outstanding combination of truly advanced instruments and unequalled experience in applying them, has successfully solved temperature problems as widely different as helium liquefaction and jet engine testing. Foxboro offers a wide variety of primary elements, transmission devices, indicators, recorders, and controllers. Whether a single instrument or a combination is required — filled-system, electronic, or electric — you can be sure of fitting the process exactly. Unique Foxboro developments, such as Dynalog® Electronic Instruments, Dynatherm® Resistance Bulbs, and the 12A Temperature Transmitter, continually maintain control standards in step with every advance of modern processing. A few of the instruments which typify Foxboro's better-engineering are shown on these pages. Chart below shows complete temperature ranges covered by Foxboro measuring systems. Write for complete details. The Foxboro Company, 819 Neponset Ave., Foxboro, Mass.

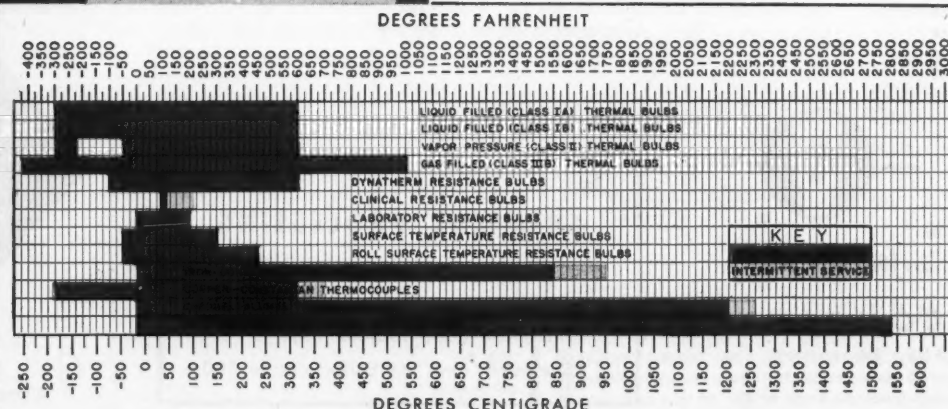
FACTORIES IN THE UNITED STATES,  
CANADA, AND ENGLAND

## FOXBORO

Reg. U.S. Pat. Off.

### TEMPERATURE measurement and control

Locate  
your  
problem  
temperature  
in this  
table



\*Reg. U.S. Pat. Off. \*\*Trademark

### Mass Flow Meter

(Continued from page 59)

jobs as measuring degree of froth, or aeration, in oil, amount of liquid water in a steam line, proportions of a flowing mixture of helium and oxygen. Comparison of liquid or gas mass flow with standard specific gravity of material indicates degree of aeration, for example, in oil.

Accuracy and linearity of flowmeter is within sum of  $\pm 1/2\%$  of maximum output and  $\pm 1/2\%$  of measured value of flow with repeatability within  $\pm 1/2\%$  over a flow range of 100 to 1 (0.15 to 15 pounds per second).

Flowmeter can handle liquids with specific gravities between 0.6 and 1.2, and viscosities of 0.2 to 24 centipoise. Flow rates can be 0 to 15 lb/sec, with overload rate to 100 lb/sec. Fluid temperature range is between -67° and 250°F with ambient air temperature range from -85° to 800°F. Flowmeter is explosion-proof, operates on 115v AC, three phase, 400 cycles. Output signal is 0 to 10v AC, diameter 3 1/2 inches, and length 10 inches.

Meters for wide range of flow rates, fluids, and power supplies can be assembled by manufacturer from basic standard component. Drive and sensing units are available for 115v AC 60 cycle.

(Model F-10 mass flow meter is product of Inertial Instruments, Inc., Dept. CP 2029 Broadway, Santa Monica, Calif. . . or for more information check 7395 on form opposite last page.)

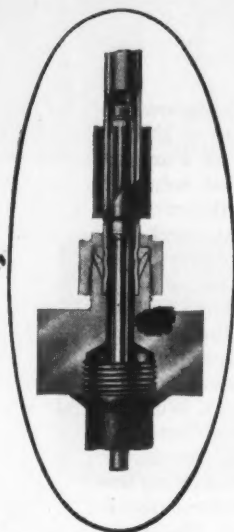
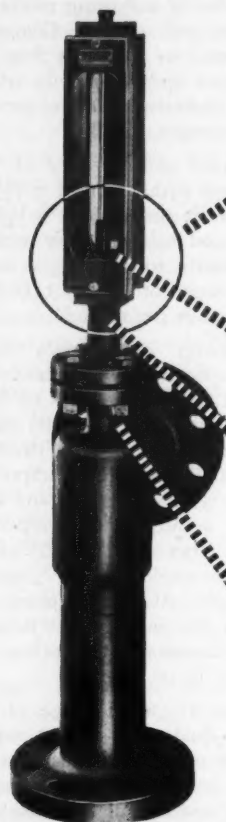
### New Instruments —

List of 350 major developments  
starts on page 66

For more information on product at left, specify 7396 . . . see information request blank opposite last page.

**BROOKS LEADERSHIP** *achieved by design*

## This AR-MET ROTAMETER...



### POSITIVE INDICATION

A magnetic follower that never loses bond . . . offers minimized friction, minimized hysteresis.

### ALL METAL CONSTRUCTION

Eliminates packing and packing problems. Holds on even the most difficult services without a chance of leakage.

### THRU-BOLTED DESIGN

Easy to assemble and disassemble. No frozen stud bolts . . . no drilling and tapping.

## TAKES PRACTICALLY ALL FLUIDS OFF THE "HARD TO HANDLE" LIST

If you're working with highly penetrable fluids . . . high temperatures, high pressures . . . Brooks Ar-Met Rotameters are made to order for you. The Brooks Ar-Met Rotameter with Mag/Na/Vue indicating extension is shown . . . however, Ar-Met meters are also available with six other alarm and transmission extensions, both electrical and pneumatic. Write for Bulletin 103.

Ar-Met and Mag/Na/Vue are trade-names.

a complete line...

# BROOKS

ROTAMETERS ...for every service

**BROOKS ROTAMETER COMPANY**

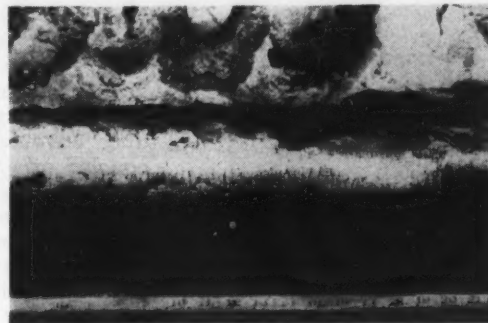
103 EIGHTH STREET • LANSDALE, PA.

When inquiring check 7397 opposite last page

## INSTRUMENTATION & CONTROL

### Ultrasonic Inspection

(Continued from page 57)



This closeup shows area chipped out of header

preventive boiler maintenance makes use of a resonant ultrasonic signal. Frequency of this signal is tuned until wall under test resonates with it. Since speed of sound is constant, resonant frequency indicates thickness of the wall. Completely non-destructive, this test enables thin spots to be found in superheater bends and tubes where comparatively shiny areas have developed. These are from erosion by flue gases or soot blowers.

**Results:** By making these tests, it was possible to tell exactly how much steel remained in tube walls. This enabled operation of power units at reduced working pressure while new headers were being designed and fabricated by boiler manufacturer. One boiler at a time was taken off the line to put new headers on outside of fire box.

One obvious advantage of the scheme was to have reliable figures on the safety of operation. In addition to this, plant management estimates that much downtime was saved by this inspection method.

(Reflectoscope used to check extent and depth of cracking is built by Sperry Products Co., Dept. CP, Danbury, Conn. . . or for more information check 7398 on form opposite last page.)

(Thickness indicating instruments — Audigage and Vidigage are products of Branson Instruments, Inc., Dept. CP, Stanford, Conn. . . or for more information check 7399 on form opp. last page.)

Yes . . .

### CHEMICAL PROCESSING

is "different!"

There are good reasons why!

See letter from the Editors, page 100.

## Analyze for PHOSGENE IN AIR

- 0-2 parts per million.
- 1 to 8 pickup points.
- Indicating and recording.



## DAVIS ELECTRO- CONDUCTIVITY ANALYZER

Send for  
Bulletin 11-70

### DAVIS INSTRUMENTS

Division of  
Davis Emergency  
Equipment Co., Inc.  
56 Halleck St.,  
Newark 4, N. J.

When inquiring check 7400  
opposite last page

CHEMICAL PROCESSING



## INSTRUMENTATION

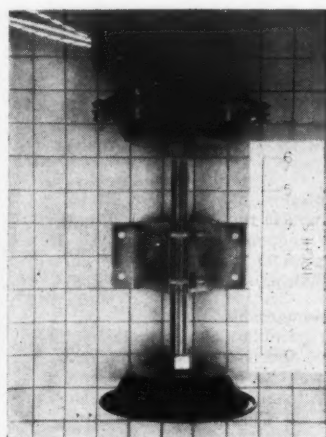
### Sensitive level control works on differential of half inch . . .

uses diaphragm operated by air pressure trapped in bowl

**Uses:** As liquid level controller for applications requiring an extremely low liquid level, or where liquid level height must be maintained with great accuracy.

**Features:** Control operates on a minimum liquid level of  $\frac{3}{8}$ ".

**Description:** Controller uses diaphragm operated by air pres-



Size of level control is indicated by scale

sure trapped in cup-shaped bowl immersed in liquid. Switch action is enclosed in a plastic case. Switch will release when liquid level is reduced by approximately  $\frac{5}{32}$ ". Operating characteristics can be adjusted according to specifications required. Switch is SPDT with contacts rated at 15 amp, 120-250v AC. Switch should be mounted on a vertical surface.

(Cat 140 Level Control is product of The Henry G. Dietz Company, Dept. CP, 12-16 Astoria Blvd., Long Island City 2, New York . . . or check 7401 on form opposite last page.)

For more information on product at right, specify 7402 . . . see information request blank opposite last page.

● Manufacturing    ●● Manufacturing and product development    ●●● Manufacturing, product development and research    ●●●● Pilot manufacturing, product development and research

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Precision Mechanics, Optical Devices, Ceramics	●●●	●●	●●	□	●●●	●●●		●●●	●●	●●	●●	●●●
Electrical Equipment and Components	●●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Electronics	●●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Hydraulics, Liquids Processing, Heat Exchange	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Television: Studio, Theatre, Business, Institutional, Industrial	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Instruments, Servos, Controls: Hydraulic, Pneumatic, Magnetic, Electronic	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Aircraft and Missile Guidance, Control, Simulation	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Automatic Computers and Components	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Radar, Microwave, Ultrasonics	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Motion Picture and Audio Equipment	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●
Nuclear Power Components and Controls	●●	●●	●●	●●	●●	●●		●●	●●	●●	●●	●●●

Librascope Desk-Size Computer

Link Aviation F-89D Jet Simulator

GPL Industrial-Institutional TV System

Griscom-Russell Shipboard Distilling Plant

Askania Electro-Jet Power Package

## SYSTEMS ENGINEERING

The GPE Companies are leaders in that small, select group in American industry which is broadly qualified to develop and produce the systems needed today for defense and industry. GPE leadership accounts for some of the most advanced systems in use in business, television, aviation, marine, steel, oil, and other industrial fields.

In Systems Engineering, highly advanced capacities and resources are prerequisite. Yet, no matter how highly advanced, they are of little use if limited to a few areas. Finding optimum solutions to complex systems problems calls for *balanced* competences. And beyond that, success calls for the consistent application of such competences *at every stage* — beginning with research, and extending all the way through development, production and final testing.

No GPE company is limited by the boundaries of its own specialties. The basic GPE operating policy, GPE Coordinated Precision Technology, places at the command of each company in the group all GPE research, development and production

facilities, and the skills and experience of the more than 2500 GPE technical men working in depth in the wide range of advanced capacities indicated in the chart above.

Behind each group working on a specific problem in one GPE company stands the whole group of GPE scientists, engineers and technicians with the answers — or the knowledge that will find the answers — to questions underlying and related to that problem. To the customers of GPE Companies this means that the concept and development of equipment, components and systems are not restricted or distorted by traditional allegiance to specific competences.

The five systems illustrated, while products of different GPE companies, are all examples of the consistent application of balanced competences, achieved through GPE coordination. For brochure describing GPE Coordinated Precision Technology and the work of the GPE Companies, or help on a specific problem, write: General Precision Equipment Corporation, 92 Gold Street, New York 38, N. Y.

## GENERAL PRECISION EQUIPMENT CORPORATION

### THE GPE PRODUCING COMPANIES

- KEARFOTT COMPANY, INC.    ● INTERNATIONAL PROJECTOR CORPORATION    ● BLUDWORTH MARINE
- GENERAL PRECISION LABORATORY INCORPORATED    ● THE GRISCOM-RUSSELL COMPANY    ● LINK AVIATION, INC.
- SHAND AND JURS CO.    ● THE HERTNER ELECTRIC COMPANY    ● THE STRONG ELECTRIC CORPORATION
- J. E. McALEY MFG. CO.    ● ASKANIA REGULATOR COMPANY    ● AMPRO CORPORATION    ● LIBRASCOPE, INCORPORATED

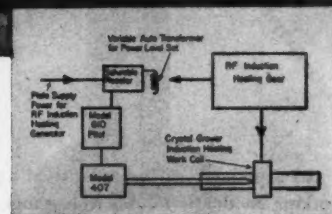


THE MARK OF QUALITY



Wheelco  
Instruments

Thermal shock eliminated . . .  
Crystal growth facilitated . . .  
By Wheelco proportioning  
temperature control!



Operator sets Model 407 Capacitrol at 1020 C control point for growth of germanium crystals used in semi-conductor devices. Drawing shows relationship of control units with work coil.

"On-off" temperature control is unsuited to the growth of germanium crystals. Harsh thermal shock imparts faults into the crystals, producing poor lattice structure. Deposition of the conductivity determining additive is erratic, rather than smooth and uniform. But, manufacturers have discovered the advantages inherent in the use of Wheelco Model 407 Capacitrols with saturable core reactors. These superb instruments provide the *smooth, stepless proportioning of heat input* that assures excellent crystals every time. In the case illustrated, a Wheelco Capacitrol is used with a saturable core reactor to modulate output of a radio frequency induction heating generator. Results have been most satisfactory for the transistor manufacturer. Solutions to control problems like this are an important part of the daily job of your Wheelco field engineer. Why not call him in to help with *your* control problems?

WHEELCO INSTRUMENTS DIVISION

**Barber-Colman Company**

DEPT. I, 1520 ROCK STREET, ROCKFORD, ILLINOIS

BARBER-COLMAN OF CANADA, LTD., Dept. I, Toronto and Montreal, Canada  
Industrial Instruments • Automatic Controls • Air Distribution Products  
Aircraft Controls • Small Motors • Overdoors and Operators • Molded  
Products • Metal Cutting Tools • Machine Tools • Textile Machinery

## new instruments 1955-1956

Listed here, you will find major instrument developments made between June 30, 1955 and June 30, 1956. While some of these instruments have been commercially available earlier, they are all new in the manufacturer's line, or in modification, or material of construction, etc. You'll find some genuine innovations listed here, too.

To save space, manufacturers of these instruments are listed separately on page 95. To find the manufacturer of a particular instrument, use the code number (the final bold number in the description) to enter the manufacturer's list.

### Actuator, plug valve

Air or hydraulic pressure provides rotary motion for plug valves. Helix piston rod can give 360° rotation — with 350 to 3360 in-lb torque (in five models) for 100 psi (33)

### Actuator, valve

Electro-hydraulic valve actuator uses signal of 75 mw; converts to thrust of 600 lb. Uses 110v AC, 60 cycle. Valve size from one to eight inches. Valve stem speed is 0.5 in/sec—no load. 0.4 in/sec—300 lb, 0.2 in/sec—600 lb. (Electro-hydraulic valve actuator — 5)

### Alarm

Differential transformer provides off-on control at pre-set limit, SPDT 5 amp 250 v AC. (Model 331 — 46)

### Alarm, temperature

Positive action of differential expansion element actuates snap-action switch, SPST or SPDT, 15 amp, 125-250-460 v AC. Range 35-600°F. (Model A-1S-160 — 32)

### Amplifier, DC

See also Electrometer

### Amplifier, DC

Contains indicating meter. Will drive recorders with 2 to 2000 millivolts. Maximum gain of 160,000. Frequency response from DC to 100 kc. Input impedance over 1,000,000 megohms. (Model 303 DC indicating amplifier — 91)

### Amplifier, DC

High gain, chopper stabilized DC amplifier. Gain is 10,000; low drift characteristics. (30)

### Amplifier, DC

Medium-gain DC pen-drive amplifier. Balanced or single-ended input. Available in units of 1 to 6 channels. (30)

### Amplifier, DC

Combination DC amplifier and electrometer indicates voltage, current, and resistance on panel meter. Amplifier circuit is direct coupled three stage. (73)

### Amplifiers, magnetic

Magnetic component to replace vacuum tubes in industrial counter-controllers. Called Fer-risitors. (22)

### Analyzer

See also tester

### Analyzer

Analyzes liquid mixtures of gasolines and chemicals with low vapor pressure at room temperature. Mass spectrometer. (40)

### Analyzers, atmosphere

Detects and records concentrations of oxidants, nitrogen dioxide, nitric oxide, sulfur dioxide below 1ppm. (Series 70 Atmosphere Analyzer — 92)

### Analyzers, chemical

Recording instrument runs automatic titration to colorimetric endpoint, repeats analysis in cycles. Handles water hardness silica, phosphate, sugar, chlorine. (Durometer — 125)

### Analyzer, chromatographic

For gas-liquid partition chromatography in analysis of gases, liquefied gases and liquids by adsorption as well as by gas-liquid partition techniques or combinations. Temperature range 0 to 275°C. (Chromograph — 78)

### Analyzer, combustion

Analyzes for oxygen and combustibles by percent volume in flue gases. Unit is portable, operating on 110v AC. Oxygen and combustible meters have both 4% and 20% range spans. (Heat Prover — 11)

### Analyzer, dissolved oxygen

Dissolved oxygen analyzer operates on differential electrical conductivity principle. Measures dissolved oxygen in high purity water in range 0-20 parts per billion, accurate to 1 ppb. Available with: indicating meter on front panel; choice of millivolt, current, or pneumatic output. (Model 2B — 19)

### Analyzer, gas

Thermal conductivity gas analyzer for continuous industrial gas measurements. Available with: single or multiple ranges; indicating meter in front panel; explosion-proof cases, millivolt, current, or pneumatic output. (Model 7C — 19)

### Analyzer, gas

Kit for determining presence of hydrogen cyanide gas in concentrations from 5 to 5000 ppm. (HCN test kit — 37)

### Analyzer, gas, chromatographic

Automatically qualitative and quantitative; continuous sensitivity control; built-in recorder; 115 v 60 cycle AC. (66)

When inquiring check 7403 opposite last page

**Analyzer, gas, chromatographic**

Recording potentiometers for use with detection cells in gas chromatographic analysis. (27)

**Analyzer, harmonic**

Device for Fourier analysis or to determine equations of curves. Non-destructive (Gerber Equameter — 74)

**Analyzer, hydrogen**

Thermal conductivity measurement of percent hydrogen in nitrogen. (Type OG1 — 11)

**Analyzer, infrared**

Dual beam, non-dispersive instrument employing selective detectors. Operates by measuring loss of energy of infrared beam passing through sample. (4)

**Analyzer, infrared**

Photometric accuracy within 1% transmission. Has dispersive design, using a prism-slit optical arrangement. (Model 176 Dispersive infrared analyzer — 20)

**Analyzer, oxygen**

Detects and measures trace amounts of oxygen in gas streams. Shows color change proportional to oxygen present for photocell detection: Sensitivity from 0-50 to 0-500 ppm by volume. (40)

**Analyzer, production**

Reports and analyzes production of plastic sheeting or paper by five classifications according to weight or thickness. (Production analyzer — 86)

**Analyzer, pulse height**

New line for radioisotope identification and measurement using pulse height. (138)

**Analyzer, radiation**

For analyzing complex gamma emitting samples. (256 Channel Analyzer — 120)

**Analyzer, servo**

Servo analyzer amplifier, for amplitude or phase-sensitive servo systems in carrier frequency range of 50 cps to 10,000 cps. (30)

**Anemometer**

Measures wind velocities to 200 mph. Contains no rotation cups or propellers. Uses short, butt-welded thermocouples. Self-compensating for temperature changes. (80)

**Anemometer**

Range: 0-30 miles per hour, with logarithmic scale. For measurements below 4 miles per hour, non-directional. (Model R-2 — 80)

**Balance, pressure**

Gives visual readouts even at remote locations. Consists of pressure-balance transducer and servo amplifier. (40)

**Breaker, vacuum**

Maintaining predetermined vacuum by automatic admission of gases or liquids on slight changes in vacuum conditions. (D-52 — 34)

**Camera, TV**

Requires only 15 foot candles. 10 x 6 3/4 x 4 3/4" (Type 5359-B Teleye — 51)

**Cell, conductivity**

For continuous measurement of effluent or material in process. Ring electrodes allow straight-through flow. (In-line Conductivity Cell — 85)

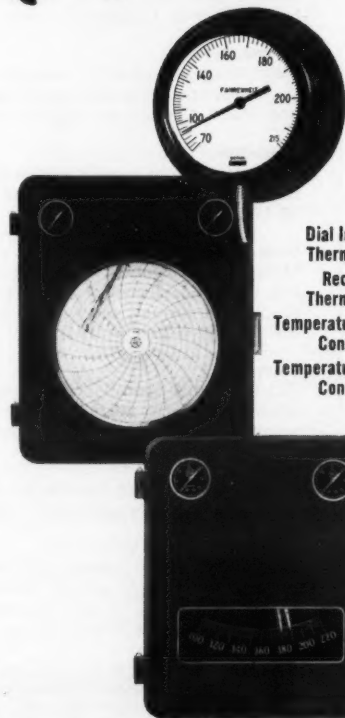
(Please turn to next page)

List in instruments manufacturers by key number  
appears on page 95.

## FILLED SYSTEM LEAKAGE



# Now A THING OF THE PAST!



Dial Indicating  
Thermometers  
Recording  
Thermometers  
Temperature Indicating  
Controllers  
Temperature Recording  
Controllers

The statement is worth repeating. "Filled system leakage is now a thing of the past!"

How come? It wasn't come by easily! It required intensive investigation and development here at Weston . . . involving design, materials, dimensioning, finishing, and manufacturing techniques and controls. The result was a new system that is far outperforming any filled system previously known.

The proof? In five long years . . . from the day the new WESTON system was introduced, *no filled system has failed in service*. The development of this new system is one more example of the forward thinking, technical proficiency and production skills that have made Weston world's leader in precise instrumentation. Catalog M2 is available for the asking. *Weston Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, N.J.* A subsidiary of Daystrom, Incorporated.

## WESTON

*Instruments*  
—TO INDICATE, RECORD, CONTROL

When inquiring check 7404 opposite last page



## DEKORON PRODUCTS CUT INSTRUMENT TUBING COSTS

### EASY-TO-INSTALL INSTRUMENT LINE HARNESS

DEKORON Poly-Cor is a new concept in instrument tubing — a lightweight instrument line harness that can be strung as easily as electric wiring.

Poly-Cor is composed of color-coded polyethylene tubes over which is extruded a thick vinyl sheath. This construction means instrument lines are completely corrosion proof. Their natural resiliency resists physical damage. Harness composed of 4, 7, 10, 14 or 19 (illustrated) individual lines is available.

Initial cost... installation... corrosion resistance... maintenance — no tubing can compare with patented Dekoron Poly-Cor. Request Bulletin L-6506.

Use Dekoron E-Z Tube Fittings. Specifically designed for use with Poly-Cor or with single-line plastic Dekoron "P" Tubing.

**Dekoron® products**

quality  
research  
service

**SAMUEL MOORE & COMPANY • MANTUA, OHIO**

DEKORON PRODUCTS DIVISION

When inquiring check 7405 opposite last page

## INSTRUMENTATION & CONTROL

(Continued from preceding page)

### Chart drive

Pneumatically positions recording charts of up to 57 remote recorders at distance to 100 ft or 35 recorders at 250 ft. Gives chart speed of one inch/hr. Operates on 115v AC, 60 cycles. (105)

### Clutch, magnetic

Battery-operated clutch requires no electric current for operation except impulse for engaging or disengaging. Remote control operation is possible. (97)

### Colorimeter

See also Spectrophotometer

### Colorimeter

Combination colorimeter and spectrophotometer for analyzing liquids or solids. Readings of transmission or optical density. (Colorimeter-spectrophotometer — 18)

### Colorimeter

Permits a repetitive analytical accuracy of  $\pm 0.3\%$ . Can be read in either optical density or percent transmission. Combines 5" mirror scale with a 0.005" width knife edge pointer. (144)

### Colorimeter, large area

Measuring surface appearance as color, color-difference and fluorescence over area of one square foot. (69)

### Computer, flow

Continuous flow integration of pressure and flow rate where allowance is made for compressibility of gas. Accuracy is within  $\frac{1}{2}\%$  of full scale output. (95)

### Computer, general purpose

Simplified computer uses magnetic drum for storing 4096 words, 31 bits in length, along 64 tracks. Drum rotates 3600 rpm and is scanned by 64 read-record heads. (LGP-30 Computer — 95)

### Control, level

Electromagnetic control of electrically conductive liquids. Uses resistance of probe circuit for single level indication, alarm. Operates on 115/230 volts. (57)

### Controller

Control system to convert pneumatic signals to electrical response. Proportional, reset, and rate actions. (Series 60 Electro-Pneumatic controller — 94)

### Controller

Measures and controls power through a saturable reactor. Proportional control of power without interrupting the flow of current, and without using relays or contactors. (Electr-O-Volt — 104)

### Controller

Provides three control actions: proportional, automatic reset, and rate to continuously process input according to size, speed and duration of variable change. (94)

### Controller, batch

Integrating flowmeter has control switch which closes at preset quantity (Electriccontact — 31)

### Controller, batch

Produces signal to actuate valve when pre-set quantity has passed through sensing element. Used for acids, corrosive solutions or light slurries, liquefied gases to 35,000 psi. Ranges from 1/10 to 30,000 gpm. (116)

### Controller, combustion

Complete burner control for gas, oil, or both on one panel. Control system factory engineered and pre-assembled to reduce installation costs. (57)

### Controller, conductivity

Measures conductivity; feeds caustic, acid as required. Activated by signal from cell immersed in solution. (50)

Choose A

Standard

**SCAM**

ALARM

for All Your

MONITORING



Typical Scam DE-LINE annunciator cabinet showing plug-in and backlighted nameplate unit. Cabinets available in four standard widths, 3-5-7 or 11 alarm points wide, any number high.

Even the most advanced automatic system needs the reliable monitoring that only good annunciators offer. And of those available only Scam gives you the benefit of broad standardization and interchangeability to cover the most specialized requirements. For instance, the DE-LINE annunciator can provide, in one standard cabinet...

1. Backlighted nameplates or bullseye indication.
2. Sequential alarm identification.
3. Easy adaption for use with Scam DU-ALL annunciators for HI-LO indication.
4. Optional ringback or manual reset functions by the operation of a slide switch.

There are many other standard features of DE-LINE annunciators that are usually provided only on special order — features that make them the most versatile available, capable of "growing" with any control system. Write for literature or call any representative in the cities listed below.

THE  
**SCAM**  
INSTRUMENT CORP.

Chicago 18, Illinois  
Phone IRving 8-9334

SALES REPRESENTATIVES:

Atlanta • Boston • Buffalo • Chicago  
Cincinnati • Cleveland • Dallas • Detroit  
Houston • Indianapolis • Kansas City  
Los Angeles • Louisville • New York  
Philadelphia • Pittsburgh • Portland  
St. Louis • San Francisco • Seattle • Tulsa  
Toronto and Vancouver, Canada

When inquiring check 7406  
opposite last page

CHEMICAL PROCESSING



**Controller, differential pressure**

Factory Mutual approved safety cutoff switch for multiple burner gas installations; pressure controller for hazardous gases; differential pressure controller for gases. (C437A Industrial Pressure Switch — 104)

**Controller, edge position**

Controls edge of moving strip or web, for even edge on wind up or unwind, or for intermediate positioning. Electro-hydraulic control with pneumatic sensing. (5)

**Controller, electronic**

Process control system converts pneumatic measurement to direct current for transmission. (American-Microsen Controller — 100)

**Controller, flow**

Pneumatic flow control with combined sensing and final element two to three pipe diameters long. Operates in any position. 4" to 24" standard pipe sizes with corrosion-resistant fittings. Rubber throttling element has given 30 years wear in accelerated life-tests. (Modulair — 130)

**Controller, flow**

For wide range of flows. Separation of sensing element and instrument permits sensing element to be mounted in hazardous locations (Class 1, Group D) while instrument is located outside of danger area. (116)

**Controller, flow proportioning**

Two sensing elements operating into a single instrument which electrically measures ratio and produces control action to correct "wild" flow. (116)

**Controller, level**

Floatless level control has plug-in relays. Operating coils are covered with moisture proof compound. (76)

**Controller, level**

Pneumatic on-off control. Operates from movement inside pressure vessel. Couples to outside through a non-magnetic stationary barrier seal by magnet. Will open or close control circuit up to 100 psi. (99)

(Please turn to next page)



"That doesn't happen to be a circuit breaker!"

**NOW AVAILABLE**

**Valve Manifolds**

**that STOP**

**Mercury Blowing,**

**Damage to**

**Differential**

**Bellows**

**and Diaphragms**

- CANNOT throw full line pressure across bellows, mercury or diaphragms of  $\Delta P$  instruments.
- Replaces 3 or 4 conventional shut-off valves, fittings, etc.
- Available with angle, 3-way or through-type bodies . . . threaded or socket-welded connections.
- Rated to 4000 psi (cold)

No conventional built-up valve manifold affords the protection EQUA-SAFE automatically gives to differential pressure type instruments. And no built-up valve manifold can beat the low installation time or low maintenance required by EQUA-SAFE valves.

The "secret" of EQUA-SAFE's protection is in the common bridge-type bonnet and the two double-seating valves it connects. When either valve is operated (and sequence does not matter) pressures in the two chambers of the differential instrument are automatically equalized through the bonnet. As soon as both valves are fully "opened" (stem out) the instrument is on the line, with no leakage between sides. When both stems are in, the instrument chambers are interconnected and completely sealed off from primary connection pressures. Teflon packings are under pressure only while the stems are traveling from "seat" to "backseat", or vice versa!

Standard EQUA-SAFE valve manifolds are made of carbon and/or stainless steel, depending on your requirements. If your requirements are unusually severe, remember that EQUA-SAFE valves can be made of any bar stock material that can be machined and welded! When inspection or maintenance are needed, this bolted-block construction pays off again. EQUA-SAFE valves can be completely dismantled without breaking any pipe connections, and the inlet seat can be dressed up in place. A reversible backseat ring gives double wear, and is merely turned upside down to present a brand new seat.

Get the entire story on what EQUA-SAFE valves can do for your differential instrument installations. Write for Republic Bulletin No. 56-1, or ask your Republic engineer. Now that there is a top-quality instrument valve manifold for  $\Delta P$  instruments, you should definitely investigate its applications in your plant.

**REPUBLIC FLOW METERS CO.**

2240 Diversey Parkway, Chicago 47, Illinois

When inquiring check 7407 opposite last page

(Continued from preceding page)

**Controller, level**

Electronic controller determines change in electrical capacitance and converts to pneumatic signal. High speed response. Stable with changes in voltage, air supply, temperature, pressure. (Pneutronic — 123)

**Controller, liquid level**

Complete control system or automatic indicator of liquid level. Electronic unit measures fluid levels or interface. Operates with any liquid with dielectric constant greater than three, on any two liquids with a difference greater than 15. (Enniscope — 59)

**Controller, liquid level**

High pressure design for service to 5000 psi uses porcelain displacers (99)

**Controller, moisture**

Recording and controlling continuous moisture unit. Uses force feed and RF capacitance measurement. Accuracy to 0.2% moisture. (Rogers controllers — 119)

**Controller, motor load**

Adjustable speed fluid drive which is stepless and variable throughout range. Speed settings controlled manually or by automatic sensing and feedback. For motors rated between 1 to 25 hp. (3)

**Controller, motor speed**

Wide speed range; constant torque; dynamic braking; many models from 1/15 to 1½ hp. (73)

**Controller, optical**

Automatically checks itself and re-sets to compensate for error. Photoelectric unit analyzes, records, controls processes involving liquids, gases, vapors. (101)

**Controller, pneumatic**

Controls and records typical variables. Narrow-band proportional (on-off), 30% proportional, wide-band proportional (to 400%), reset, derivative and reset (up to 300 repeats minute), plus derivative (27)

**Controller, pressure**

Signals when pressure rises or falls to danger zone. Shuts down system at predetermined safety limit. Manual reset. Three proof pressures: 6, 30 and 120 psi, with adjustable range from .05 to 100 psi. (16)

**Controller, pressure**

Measurement and control of pressure; small case: 11¼ x 11¼ x 4¼ inches; on-off or proportional control; calibrated accuracy of ±1%. (Model 704P9 Indicating Pressure Controller — 104)

**Controller, pressure and temperature**

Recorded control, pneumatic, 9" and 12" spring or electric driven charts, on-off, duplex on-off and 1-100% proportional action, 0-5000 psig pressure ranges, -350° to 1200°F temperature ranges. (Type 57 — 34)

**Controller, pressure and temperature**

Control and indication, pneumatic operated, 1-100% proportional and differential gap, 1-150% proportional and automatic reset, 0-30" WC to 0-10,000 psig, and -40°F to 1000°F ranges. (Type 51 — 34)

**Controllers, process**

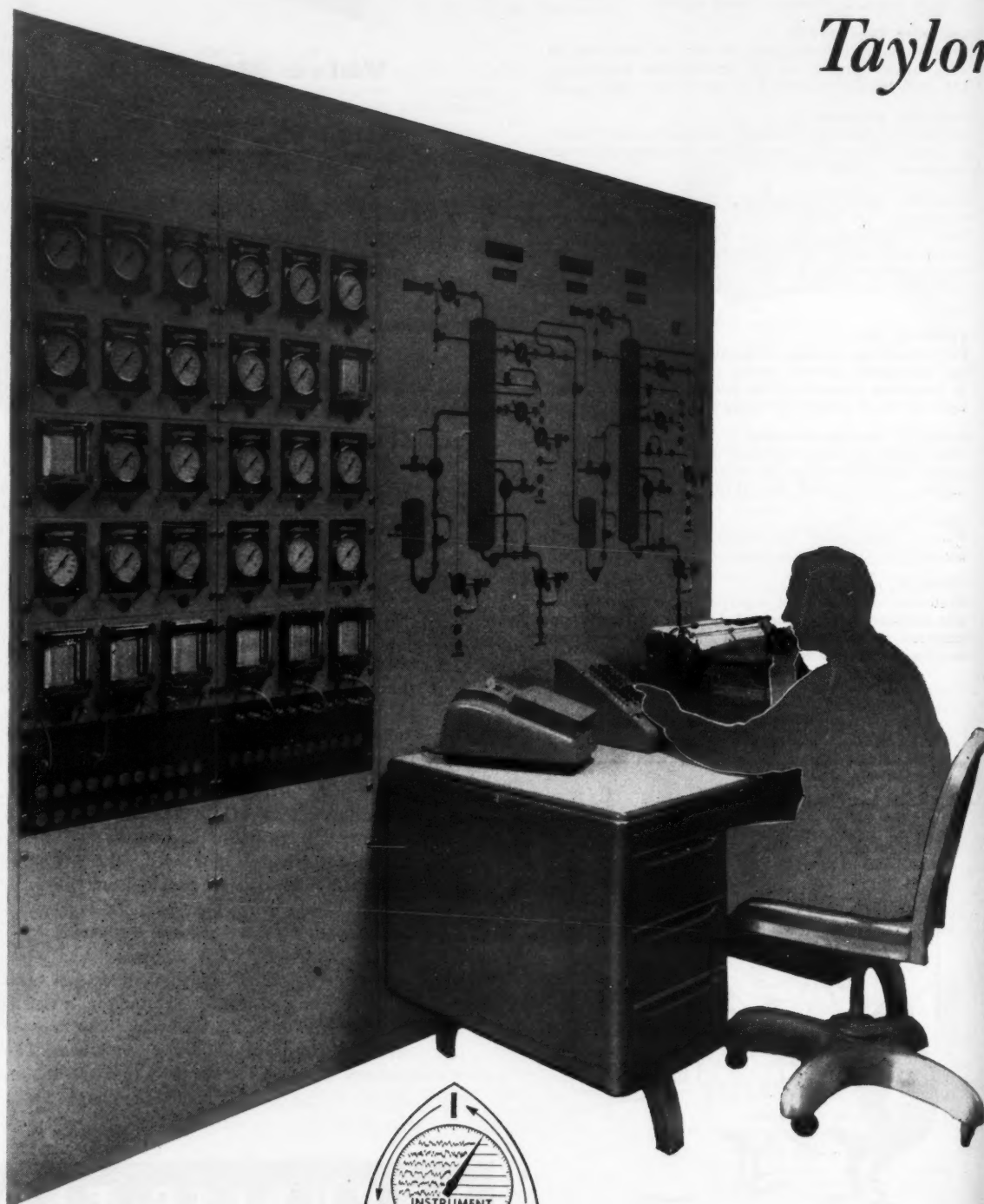
Scanning and data logging process control system for up to 100 points. Ties in with graphic panel and can be used with pneumatic or electric instruments. (Trans-Scan-Log Control System — 135)

**Controller, program**

For any variable transmitted pneumatically or electrically. Positions pneumatic transmitter in accordance with time/amplitude function of cam. Standard cam speeds are 1, 4, 8, 12 and 24 hours per revolution. (Type WM55A class TA — 11)

# BIGGEST NEWS

*Taylor*





# AT THE I.S.A. SHOW

## Trans-Scan-Log Control System!

**M**AKE the Taylor booths your headquarters for scanning and logging at this year's ISA Show. You will see an actual working model of the TSL System . . . the soundest and the most logical integration of process control with process scanning and logging yet devised . . . *a boon to advanced systems engineering.*

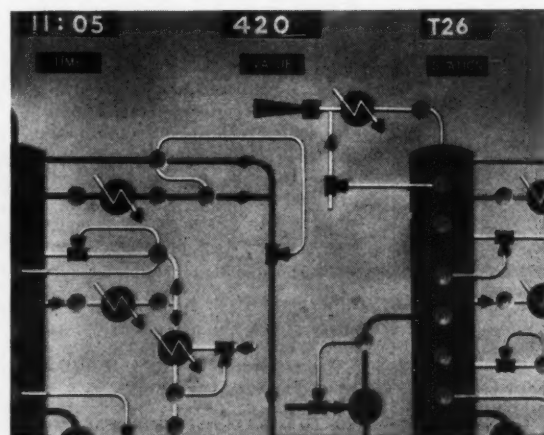
The Taylor system goes far beyond today's practices. It is, in essence, a very compact intelligence center which coordinates all related process data, enabling the operator to instantly visualize, evaluate and act upon every processing irregularity as it occurs—without leaving his desk in front of the panel. In addition, it employs the most modern techniques in scanning and logging. Thus the project engineer can observe the entire plant operation more efficiently than ever before.

As well as furthering automation in plant operation, the TSL System is a research tool in collecting data on existing units. It can provide accounting or market-

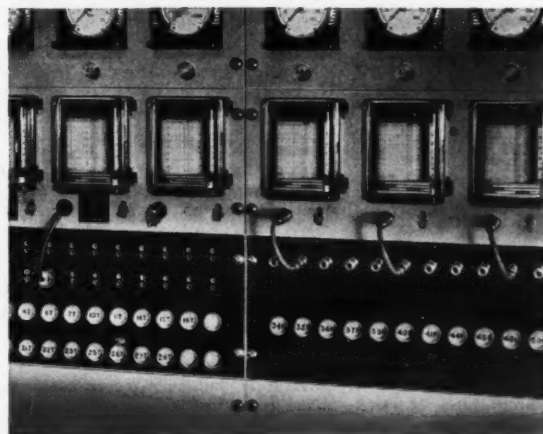
ing departments with production data as it is accumulated, either on punch cards or tape.

The complete system takes approximately 60% of the space normally required by a standard graphic panel *without* scanning and logging. Because of this compactness one operator can identify and correct any off-normal condition, as well as having a continuous trend record. It is highly dependable, because the Taylor system makes it possible to use simpler, less expensive units.

Nearly two hundred process engineers from all over the country have already visited Rochester to see this advanced equipment demonstrated. If you are unable to visit the ISA Show your Taylor Field Engineer will be glad to make the necessary arrangements for you to see the TSL system in operation. Meanwhile, write for **Bulletin 98268**. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.



**Graphic Panel**—A normal 20-foot graphic panel can easily be compressed into a 5-foot section because space is not required for receivers. Flow lines and symbols can be modified quite simply for process changes. Station identifications are illuminated, also digital readout of time, value and station for on-demand or off-normal. (Off-normal alarm also audible). Point scanning is continuous at the rate of one per second. Scheduled point logging can be set as required.



**Process Control Panel**—Note plug-in TRANSET\* pneumatic control stations, complete with automatic to manual switching. Recorders and indicators are easily interchangeable. All internal connections are completed, ready for field hook-up. Station identification lights give visual tie-in with graphic panel. Convenient electrical and pneumatic plug jacks are provided to record trends of any non-controlled variables.

\*Reg. U. S. Pat. Off.

*Taylor Instruments* **MEAN ACCURACY FIRST**

When inquiring check 7408 opposite last page

### INSTRUMENTATION & CONTROL

#### Controller, program

Electric or pneumatic controller and recorder are used as unit. Two variables can be independently but simultaneously controlled. (Cycle controller — 27)

#### Controller, refractive index

Null balance system includes photocell. Electrical output. Response: full scale in 15 sec; drift:  $\pm 0.5\%$  in 24 hr; sensitivities: 0.0001, 0.00001, and 0.000002. (Differential refractometer — 17)

#### Controller, self-operating temperature

Valves in sizes  $\frac{1}{4}$ " to 4" with temperature ranges of 25° to 325°F, direct or reverse acting. (Series V — 34)

#### Controller, temperature

Indicates and automatically controls temperatures to 2500°F. Operates on current of less than 1  $\mu$  amp. (9)

#### Controller, temperature

Either 100% throttling action or on-off snap action. Four bulb ranges cover temperatures from 0-100°F, 40-140°F, 40-240°F, 100-350°F. Standard capillary tubing is eight feet, maximum of 35 feet. Pressure range to 5000 pounds. (24)

#### Controller, temperature

Thermistor-actuated plug-in unit for assembling single or multi-point temperature control systems. Up to 100 plug-in controllers can be mounted on one chassis. Control ranges are -100 to 50°F, 0-150°F, 100-300°F, and 200-600°F. (64)

#### Controller, temperature

Controls and indicates temperatures of gases and liquids from -150° and +650°F. Twelve models offer spans of 300° or 550°F. Dead band is 0.5°F. Rating is 15 amp, 115/230v AC. (Type E32N Indicating Temperature Controller — 139)

#### Controller, temperature

Differential expansion element modulates compressed air at pressures to 50 psig. Temperature ranges from 50 to 1400°F, and to 1800°F on special order. (Model DA — 32)

#### Controller, temperature

Measurement and control of temperature; range: 40 to 180°F, and 0 to 70°F. (Ambi-Stat — 104)

#### Controller, temperature

Adjustable thermostat. Has two ranges: 600 to 1900°F, 600 to 2400°F. Accuracy of  $\frac{1}{4}$  to  $\frac{1}{2}\%$  full scale. Resistant to corrosive atmospheres. Contacts of switch rated at 15 amp, 125v AC. (Temp-Gard — 44)

#### Controller, temperature

Control by differential expansion of solids, on-off only. Indication by separate bi-metal dial thermometer enclosed in control element. SPST or SPDT, 15 amp, 125-250-460 v AC. To 750°F. (Model LD-1S — 32)

#### Controller, temperature

Controls flow of fuel or heat transfer media through diaphragm control valves to maintain a preset temperature. (24)

#### Controller, viscosity

Controls automatically, adds solvent to correct for evaporation losses. Moving piston. (Mod M8C — 110)

(Please turn to next page)

Companies which developed these new instrument ideas are alphabetically listed in a guide on page 95 of this feature.



**"Varec"**

## AUTOMATIC TANK GAUGES

### MAGNETIC DRIVE for HIGH PRESSURE PETROCHEMICAL SERVICE

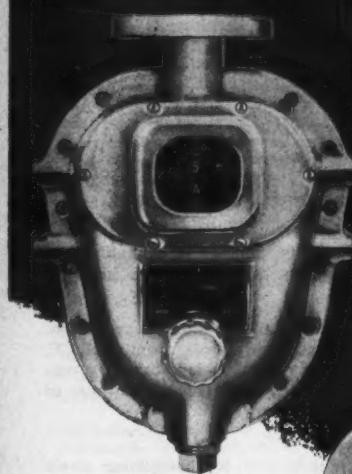


FIG. NO.  
**2500C**

When you buy automatic tank gauges for petrochemical service — accuracy and safety are important requisites. "Varec" offers you both. Accuracy is assured by counter and dial reading, clear and distinct — without the danger of parallax or difficulty of reading a scummy tape. Dependable safety is insured by the magnetic drive rotating the counter and dial reading mechanism. Remote Gauger Transmitter or other auxiliary equipment. Prevents pressurizing sight glass chamber or transmitter housing. Isolates both from corrosive or dangerous tank vapors. Sight glass is kept clear without use of wiper. No danger to personnel by possible glass breakage.

In addition to these exclusive features, the Fig. No. 2500C and Fig. No. 2500CR have a host of advantages:

1. Neg'ator motor for motive power.
2. S.S. type 316 sheaves.
3. Shielded type 316 ball bearings.
4. All parts either 316 S.S. or pure aluminum — natural electrical ground — no plastics.
5. Gravity compensator for product change.
6. Built to API Standard 2500 for custody transfer.



FIG. NO.  
**2500RC**

"Varec" Fig. No. 2500C is designed for gauging liquid level of chemicals stored in high pressure spherical tanks. Gauge head has heavy carbon steel flange to permit bolting for high pressure service.

"Varec" Fig. No. 2500CR is an inverted design of the Fig. 2500C, permitting its use on all tanks, below or above ground, where top readings are required. Stainless steel tape connects from gauge head to float in a straight line, eliminating use of sheaves and brackets, thus reducing friction and promoting greater accuracy.

Both types are available in two operating pressure ranges: 150# p.s.i.g. and 300# p.s.i.g. These are only two of a wide variety of "Varec" Automatic Tank Gauges. All are designed to be combined with "Varec" Electronic or Pulse Code Telemetry equipment, remote gauging, temperature transmission, automatic tank switching, and remote controls. Send for "Varec" Bulletin CP-3007 for information on the entire line of gauging equipment.

961.15

## THE VAPOR RECOVERY SYSTEMS COMPANY

**"Varec"**

Compton, California, U. S. A.

Cable Address: Varec Compton Calif., (U.S.A.), All Codes

When inquiring check 7409 opposite last page

## INSTRUMENTATION & CONTROL

(Continued from preceding page)

### Converter, digital

New voltage-comparison type analog-to-digital converter features 5000 codings per second; three-digit output plus sign. (12)

### Converter, digital

Converts analog to digital readout. Full scale sensitivity (digital output - 999) is 10MV. (40)

### Converter, digital

Converts shaft rotation to binary digits. Unit has 360° rotation equivalent to 16-digit binary number (or 65,536). (Digital converter — 14)

### Converter, digital

Converts input signals (DC voltages) into shaft position of null-balance potentiometer. Analog input span between 0-1 millivolts to one volt. Ten readouts per sec with  $\pm 0.15\%$  of full scale accuracy. (Type P Digi-Coder — 65)

### Converter, electric to pneumatic

Input spans of 10 to 60 mv are converted to 3 to 15 psi. Sensitivity is 0.05% of full scale. Time for signal change over full range is four seconds. (EMF/Pneumatic converter — 67)

### Converter, pneumatic square root

Extracts square root function of signals from differential pressure transmitters to produce pneumatic signals directly proportional to flow. Ranges: 3-15 and 3-27 psig for both input and output. (Type KC16 — 11)

### Counter

Used for industrial counting and control systems for counting by tens, dozens, hundreds, gross, etc. (12)

### Counter, automatic flow

For accurate assay of a large number of samples of low activity and of low radiation energy. (138)

### Counter, batch

Counts number of items in a batch. Will count number to make up a lot. Rings bell or stops machine at predetermined count. (133)

### Counter, electric

Adds on impulse from one switch, and subtracts on impulse from second switch. 500 cpm 110 v 60 cy AC. Panel Mounting. (52)

### Counter, electric

Panel mounting electric counter reset by key from front of panel. Designed for application where necessary to guard against unauthorized resetting. Six digit. (PIC 600 — 118)

### Counter, electric

Integrating counter for use with functionalized pneumatic transmission system. Cam-type pulse transmitter at measurement point, seven-digit counter at remote location. (27)

### Counter, electronic

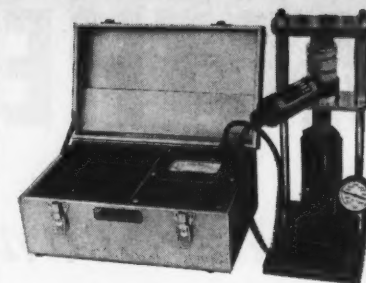
Totalizers, preset counters, dual preset counters. Totalizers available in speeds from 4 to 20 kc. (12)

### Counter, electronic

Uses magnetic elements in place of vacuum tubes. Input sensitivity is 0.1 ma—into 10,000 ohm load. Counts at rates to 10,000 per second. (Series 5840 Magnetic Controller — 21)

### Counter, electronic

Designed for flow measurement with manufacturer's sensing element. Six digit mechanical register plus two glow-transfer decades. Accuracy of 0.5 of 1%. Binary dividers give pushbutton calibration with scale factors from 1 to 2047. (Model 25 — 116)



## Is improper moisture in your products...

...adding to operating expense?  
☐ yes ☐ no

...slowing production for tests?  
☐ yes ☐ no

...bringing customer complaints?  
☐ yes ☐ no

Any yesses? Then it will pay you to find out how the Granular Moisture Register model GS, operating on high frequency power loss principal, will indicate moisture content quickly and dependably, help solve those problems with...1-minute tests on the spot!  
•Practical Accuracy Guaranteed!  
•No skilled technicians! •Two weeks free trial!

### Most granular products such as:

- Ammonium Nitrate • Ammonium Sulphate
- Toilet Soaps • Plastic Molding Compound
- Polyvinyl Chloride • Ammonium Perchlorate
- Sodium Bicarbonate • Polyethylene

Resins

DOZENS MORE

## Granular Moisture Register Instruments

Moisture Register Co., Dept. CPB  
P. O. Box 910, Alhambra, Calif.

☐ We are interested in 2 weeks free trial offer. Send additional information regarding Model GS.

We will want to test \_\_\_\_\_

in a moisture range from \_\_\_\_\_ % to \_\_\_\_\_ %.

Firm Name \_\_\_\_\_

By \_\_\_\_\_ Title \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 7410  
opposite last page

CHEMICAL PROCESSING

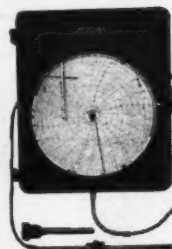


#### 4 1/2" DIAL THERMOMETERS

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.

**PALMER**  
MERCURY ACTUATED  
Temperature Indicating  
Instruments

#### RECORDING THERMOMETERS



Twelve inch die-cast aluminum case with black or white wrinkle or satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 +950°F or Equivalent in °C.

#### INDUSTRIAL THERMOMETERS

Red-Reading Mercury —Extruded brass case — chrome finish. Ranges —40 +950°F or Equivalent in °C.

#### RED-READING MERCURY LABORATORY THERMOMETERS

Thoroughly annealed for permanent accuracy. Complete line A.S.T.M. and fractional division types.

WRITE FOR CATALOG INFORMATION

**PALMER**  
THERMOMETERS, INC.  
Cincinnati 12, Ohio • Metro: 1500

When inquiring check 7411  
opposite last page

## INSTRUMENTATION & CONTROL

#### Counter, electronic

Frequency counter which counts electrical pulses which through transducers can represent rpm, flow, or other physical or electrical characteristics. (134)

#### Counter, gas flow

Flow computer totalizes flow on counter in orifice measurement of gas. (95)

#### Counter, preset

Counts operations, revolutions, etc., to desired totals. Or controls linear flow by inches, feet, yards, etc., for packaging. Measures liquid flow by quarts, gallons, liters, etc., to predetermined amounts. Maximum counting rate 2 kc. (12)

#### Counter, radiation

Alpha, beta, gamma. Four-pi flow counter detects radiation over 4-pi steradian. Connects to suitable scaler. (120)

#### Counter, radiation

Flow proportional counter for soft beta detection. (Sugarman — Los Alamos Counter — 120)

#### Counter, scintillation

Sensitivity three micromicrocuries of a gamma emitting sample. (Well-Type Counter — 120)

#### Counter, scintillation

Handles scale input to ten mc. Can be based on either decade or binary system with resolution of 0.1 micro-seconds. (4000 Series 10 mc scalars — 55)

#### Densitometer

Indicates optical density (transmission of 90 to 0%) and will sound alarms or operate blowers or dampers when monitoring smokestacks or ventilating ducts. (56)

#### Detector, conductivity

Battery-operated portable AC bridge. Covers range of 40-40,000 micromhos. Uses eye null-indicator and earphones to detect bridge balance. Scale of temperature from 32° to 122°F. (RB-188-1 Solu-Bridge — 85)

#### Detector, flame

Senses flame condition in boiler using flame rectification and infrared radiation to detect flame. Can be used on oil as well as gas fires. (Flame-Otrol Models 1500 and 1400 — 15)

#### Detector, temperature

Platinum sensing elements detect temperatures ranging from —330 to +1380°F. Response accurate within ± 0.6%. (123)

#### Disc, rupture

Discs for emergency pressure relief are specialized for applications operating at high temperatures or under extreme pulsating pressures. (Model D and DV — 24)

(Please turn to next page)

### Top-heavy reading load?



Keeping tabs on latest developments in our fast-moving industry is a chore. CHEMICAL PROCESSING speeds your task with its unique format and sectionalization, and terse to-the-point articles.

Read how on page 100.

## NEW TEST EQUIPMENT FROM THERMO ELECTRIC



### MINI MITE Portable Indicator

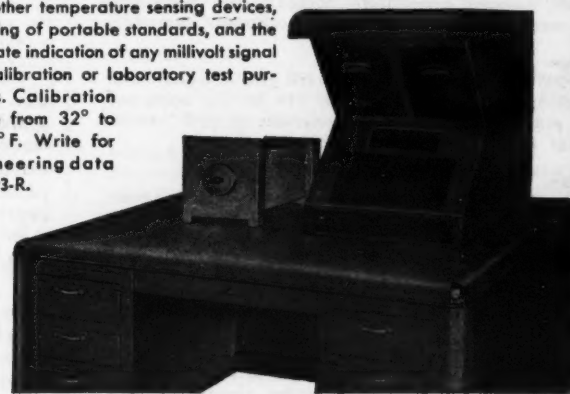


A midget-size portable potentiometer indicator—this compact, lightweight unit weighs under four lbs. and measures only 4" x 5" x 6". Yet it has a double scale 23 1/2 inches long! Standard range includes a scale of 0°–1800° F. for Iron-Constantan and one of 0°–2400° F. for Chromel-Alumel. Other scales also available. Another outstanding feature—the "Mini Mite" serves a dual purpose! It can be used to measure temperature directly when connected to a thermocouple, or, to check other potentiometer or millivoltmeter type instruments when used as a comparison instrument. A

three-position switch permits quick selection of scale or elimination of cold-junction compensation. Write for Bulletin 64-R.

### Thermocouple Calibration Console

This complete equipment package was designed for industries requiring frequent calibrations to maintain temperature measuring accuracy. Highly flexible in performance, it provides precision calibration of thermocouples and other temperature sensing devices, checking of portable standards, and the accurate indication of any millivolt signal for calibration or laboratory test purposes. Calibration range from 32° to 2000° F. Write for engineering data EDS-23-R.



### Other NEW T-E Instruments

"AutoRef" Cold-Junction Unit • Portable Self-Balancing Indicator Multi-Point Controller • Standardized Ten-Point Midgit Monitor Self-Balancing Indicator with Remote Selector and Digital Readout

See All These at the I. S. A. Show, New York Coliseum, Sept. 17-21, Booth No. 1324

**Thermo Electric Co., Inc.**  
SADDLE BROOK, NEW JERSEY

In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

When inquiring check 7412 opposite last page



(Continued from preceding page)

**Electrometer**

See also Amplifier, DC.

**Electrometer and DC Amplifier**

Voltage, current, and resistance indicated directly over wide ranges; high sensitivity (as low as  $3 \times 10^{-12}$  amp full scale); component shield available. (Type 1230-A Electrometer and DC Amplifier — 73)

**Filter, instrument air**

Capacity of 50 scfm with 15" WC pressure drop. Reusable filter knocks out particles 40 microns or larger (Model F-1 — 39)

**Flowmeter**

See indicator, flow

**Flush feeder**

For accurate proportioning of highly concentrated slurries and acids. Capacities from 0.2 to 650 gph, pressure to 1700 psig. (Flush Feeder — 23)

**Gage**

Line of compact, self-contained measuring instruments for draft, pressure, differential gas pressure, temperature. Receives pneumatic signal from transmitters. (122)

**Gage case**

Protects gage face. Thin stainless plate, covering the back of the case, relieves explosive pressures. (102)

**Gage, maximum pressure**

Pressure applied is trapped inside Bourdon tube until released by push button. Range of 0-400 psi. (102)

**Gages, pneumatic**

Complete line of pneumatic receivers and gages for draft, pressure, temperature reduced in size. Each gage or receiver is an independent, self-contained unit. (122)

**Gage, strain**

0.0005-inch thick copper-nickel foil grid on epoxy resin backing. Nominal resistance is 119 to 121 ohms per 10 gages having a resistance tolerance of  $\pm 0.2$  ohms. Gage factor approximately 2.20. (13)

**Gage, thickness**

Beta gage for sheet materials as plastic, paper, rubber. Uses radioactivity and electronic circuitry. (138)

**Gage, thickness**

Portable hand gage. Double range scale—0.006 to 0.060" and 0.000 to 0.007". Accuracy of  $\pm 5$  to  $\pm 10\%$  within 50% of calibration point. (PM Thickness gage — 72)

**Gage, vacuum**

Measuring vacuum over ranges—100 to 1  $\mu$  Hg, 100 to 0.1 mm Hg. Uses resistance bridge circuit fed from oscillator. Four gage tubes can be connected. Uses 110/240v AC. (Autovac — 40)

**Gage, vacuum**

Has a range of 0.5 microns to 1000 microns Hg. Accurate to within 2%, instrument is temperature compensated. Uses thermocouple. (131)

**Gage, vacuum**

Gives direct, continuous pressure readings from 1 to 2000 microns Hg. Measures both total pressure of condensable vapors and permanent gases. (40)

**Gage, vacuum**

Hot-wire unit gives continuous pressure readings from 100 millimeters Hg to 1 micron (0.001 millimeters) Hg. Has automatic switching from millimeter to micron range. (40)

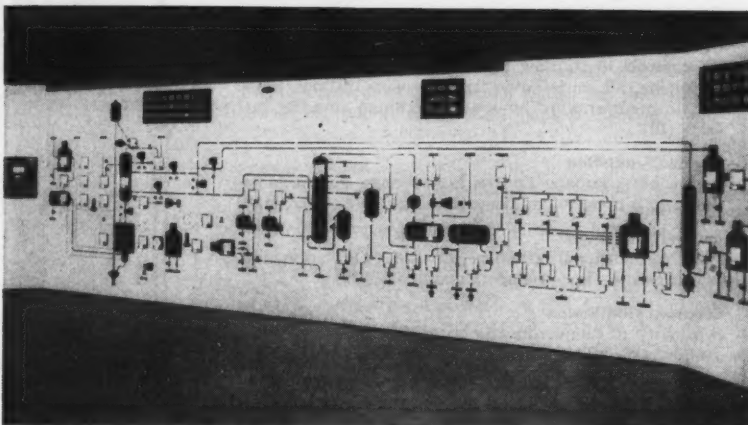
**Gage, vacuum**

Single meter, ranges: 0-100, 0-1000  $\mu$  Hg, 0.1-20 mm Hg. 110 v 60 cps power. (80)

# BRISTOL'S INSTRUMENTATION



News and information about automatic controlling, recording and telemetering



TYPICAL GRAPHIC PANEL of Bristol Metagraphic instruments in oil refinery. Panel designed by The Fluor Corporation and built by Panellit Inc.

## New design freedom for systems engineers!

A fully flexible plug-in, functional-unit system, Bristol Metagraphic instrumentation is easiest to plan, install, operate and service

A new concept in automatic control and instrumentation, Bristol's Metagraphic instruments are installed as a three part system with transmitters, receivers, and automatic controllers *completely independent of each other except for connection through a universal 3-15 psi pneumatic signal.*

This functionally designed unit system allows a new degree of freedom from pre-installation decisions by the installing and planning engineers. Changes in instrument layout and control actions can be accomplished in an absolute minimum of time and cost.

### Transmitters for every variable

Metagraphic transmitters are available for measuring temperature, flow, liquid level, pressure, absolute pressure, differential pressure and mechanical motion.

The transmitter converts the measurement into a universal 3-15 psi signal, proportional to the measured variable, and sends it to an indicating or recording receiver or an automatic controller.

Calibrated simply in terms of 3-15 psi air pressure; Metagraphic receivers and controllers thus are independent of the actual variable being measured by the transmitter and can be used with equal accuracy to indicate, record or control any of the variables that the different transmitters are capable of measuring.

Metagraphic transmitters are available in a variety of ranges and spans—easily field-adjusted—many with over-range protection to 400%. Their high air output (3cfm) means better recording and control in any application.

### Choice of 34 automatic controllers

Bristol Metagraphic controllers are available in 34 different models to suit every need. Yet *almost complete interchangeability between models is possible.*

Full-plug-in construction allows easy change of control mode or service, and practically eliminates down time for maintenance.

Controllers may be receiver-, pipe-, or surface-mounted plug-in type or pipe-connected. Remote or integral set-point types (with or without air loading) are available.

**Five modes of control action:** On-off, adjustable proportional, adjustable proportional plus reset, fixed proportional plus reset, and proportional plus reset plus derivative (rate).

### Quick-change receivers in 35 models

With 35 models to choose from, and full plug-in construction available, Bristol's Metagraphic receivers give you unmatched flexibility in operation.

You can change from a recorder to an indicator or vice versa in 10 seconds. If trouble is

suspected, the receiver can be replaced to eliminate down time while it's checked in the shop. There's absolutely no interruption of automatic control since the receiver is outside the control loop.

And . . . check these features:

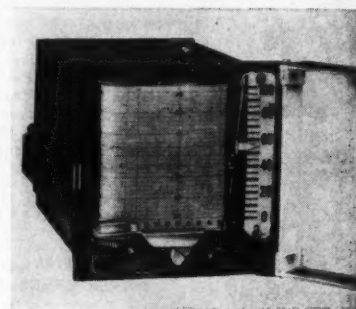
**Continuous valve position indication** is on same scale as set point. Simply match pointers to achieve "bumpless transfer." No need to read scales.

**High-visibility** colored fluorescent paints make pointers easy to identify.

**Air chart drives** are 100% pneumatic (operating from 20 psi supply). No electricity required.

**Universal piping manifold** can be adapted to any piping system (2-pipe or 4-pipe). No special tools or parts required.

Write for complete data on versatile Bristol Metagraphic instruments for your control, recording or indicating needs.



BRISTOL TWO-PEN metagraphic recording receiver.

### Two-pen receiver keeps tabs on four variables

One of the 35 Bristol Metagraphic receiver models available, the two-pen recording receiver records, indicates and controls one measured variable, records one related variable on the same chart and gives a continuous indication of either set point or valve position—whichever is desired.

If valve position is chosen to be continuously indicated, the set point may be indicated at any time by depressing the valve knob. Similarly, if set point is continuously indicated, depressing the knob indicates valve position.

The two-pen recording receiver has the easy readability, compact construction, and plug-in flexibility that characterize all Bristol Metagraphic instruments. It's available with manual-automatic station or six-position transfer valve for cascade control.

Write for complete technical data on this versatile pneumatic recording receiver.



# NEWS AND NOTES

*instruments from Bristol . . . leaders in human-engineered instrumentation*

## A Subs hot—but under good control

Construction of the hulls for atomic submarines, Nautilus and Seawolf, probably represents the most massive, elaborate, and radically different welding and hull-rolling job ever attempted.

Built by General Dynamics Corporation, Electric Boat Division, Groton, Connecticut, the subs are constructed from short circular sections (like pipe sections). These sections are welded together around their circumference to form the cigar-shaped hull.

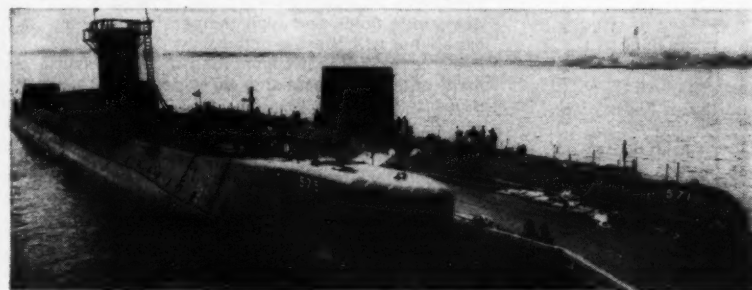
Before welding, the area immediately adjacent to the welds is preheated with induction coils wrapped around adjacent ends of the sections to be welded. Bristol Dynamaster pyrometers precisely control the heat produced by these coils.

When preheated to the proper tem-

perature, the sections are "hull-rolled" while stationary welding machines make the weld at constantly controlled temperatures. After welding is completed, the Dynamaster-controlled induction coils maintain the area around the weld at a uniformly decreasing temperature to insure cooling with maximum strength and toughness.

It takes days to complete the preheating, welding, and cooling for a single hull-section pair. Throughout this period the Dynamaster pyrometers keep the hull temperature at the design value, despite widely varying atmospheric conditions.

Want to find out more about Bristol Dynamaster pyrometers for your temperature control job, large or small? Write for Bulletin P1245A.



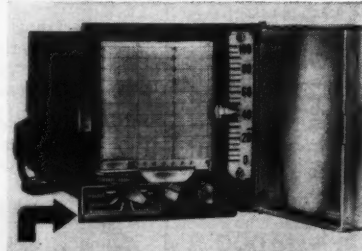
## Special receivers simplify cascade control

Bristol's Metagraphic receivers for cascade control are offered in a wider variety of models than any similar competitive instrument.

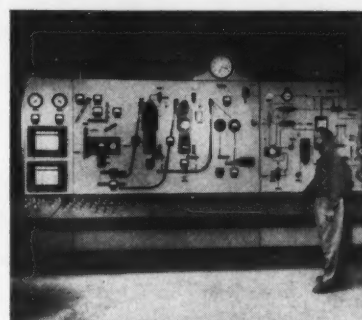
The cascade receiver (or "slave" receiver) is available as a one or two-pen recorder or a one- or two-pointer indicator, or a one-pen, one-pointer model. The two-pen recorder is unique with Bristol. With it, the master controller measurement can be recorded on the same chart as the slave controller record, thus placing both related variables on the same chart. Another, related variable can be recorded in place of the master-controller variable, of course.

One big advantage of Metagraphic cascade control over other similar receivers

is the six-position transfer valve, on one knob. Most other models require two knobs, and pointers on two scales in order to achieve bumpless transfer. With Bristol's six-position model you just match pointers on the same scale, and switch over.



SIX-POSITION TRANSFER VALVE on one knob for cascade control.



GRAPHIC PANEL at Central Soya Company's plant at Chattanooga, Tennessee.

## Bristol instruments help process Soy Beans

Centralized control of a soy-bean oil extraction plant is the function of this graphic instrument panel, installed at the Chattanooga, Tennessee, plant of the Central Soya Company.

Multiple-point Bristol Dynamaster and Metagraphic recorders monitor temperatures and pressures throughout the process, as well as plant power consumption and steam pressure. Ammeters on the panel show current drawn by equipment and conveyor motors. Control switches and running lights are located on the desk surface at front of panel.

One compelling advantage of this graphic panel instrumentation system is that it safely and conveniently shows both management and operating personnel the whole operation. Quality control is greatly facilitated; system upsets may be analyzed and corrected before the final product is affected. This over-all picture is otherwise very difficult to get since the process occupies a building four stories in height that has floor levels made of steel gratings.

## OUR ENGINEERS . . .

will be glad to discuss your specific instrumentation or control problem with you. Or, write for complete technical data on any of the instruments mentioned on these pages. The Bristol Company, 141 Bristol Road, Waterbury, Conn.

6.21

## INSTRUMENTATION & CONTROL

### Gaussmeter, NMR

Covers the range of 300 to 18,750 gauss and will provide absolute measurements with accuracies as high as ten parts in a million. (114)

### Generator, ultrasonic

Cleaning of small parts, and for experimental work with ultrasonics. (Model AP-25 — 26)

### Heater, cartridge

Gives surface temperatures up to 1250°F. Controls ambient temperature of instruments, equipment. (84)

### Indicator

Millivoltmeter has short response time, accuracy of 1%. Temperature compensated. (Model 580 — 27)

### Indicator, absolute pressure

Thermopile principle; two ranges 0.5-5 and 0.1-20 mm Hg. (80)

### Indicator, capacitance

For wide variety of measurements where transducer can be used to change variable to electrical capacity. Sensitivity as thermometer, for example, is 0.001°C. (Proximity meter — 123)

### Indicator, check valve

Slight flow indicator plus check valve in one unit. Has self-aligning soft seat flapper which prevents back-flow. For 2" and 1½" pipe. (65)

### Indicator, dewpoint

Measures dew point of gases. Mirror surface is cooled until dew forms. Temperature describes water-vapor content. (72)

### Indicator, digital

In-place readout indicator presents readings at rates to 15 per second. (22)

### Indicator, flow

Armored flowmeter for purge service or flow rate indication at elevated pressures to 1500 psig and 400°F. (Model 3602 — 29)

### Indicator, flow

Measures rate of flow up to 210 gpm where accuracy of  $\pm \frac{1}{2}$  of 1% is required. Has range of 20:1. Accuracy not affected by piping configuration. (65)

### Indicator, flow

Actuates a switch if flow fails. Functions with any flow over 1½ gpm. (70)

### Indicator, flow

Plastic armored rotameter for small flows. (Guarded flowmeter — 75)

### Indicator, flow

Flow computer dials give indication of instantaneous flow rate in orifice measurement of gas. (92)

### Indicator, flow

Uses ultrasonic pulses in non-obstructive sensing element to measure volumetric flow rate. Can be corrected to read mass rate directly. (Ultrasonic flowmeter — 65)

### Indicator, flow

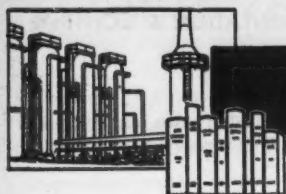
Direct indication of cfm of gas to 50 cfm. Can be used with shunt for greater capacity. Easily recalibrated for varying density. (Vane meter — 128)

(Please turn to page 77)

WHAT'S NEWS AT BRISTOL . . . WHAT'S NEWS AT BRISTOL . . .

List of instrument manufacturers by key number appears on page 95.

When inquiring check 7413 opposite last page



# processing and engineering data

166

## Correcting draft gage readings for air temperature

Data furnished by  
TRIMOUNT INSTRUMENT CO.

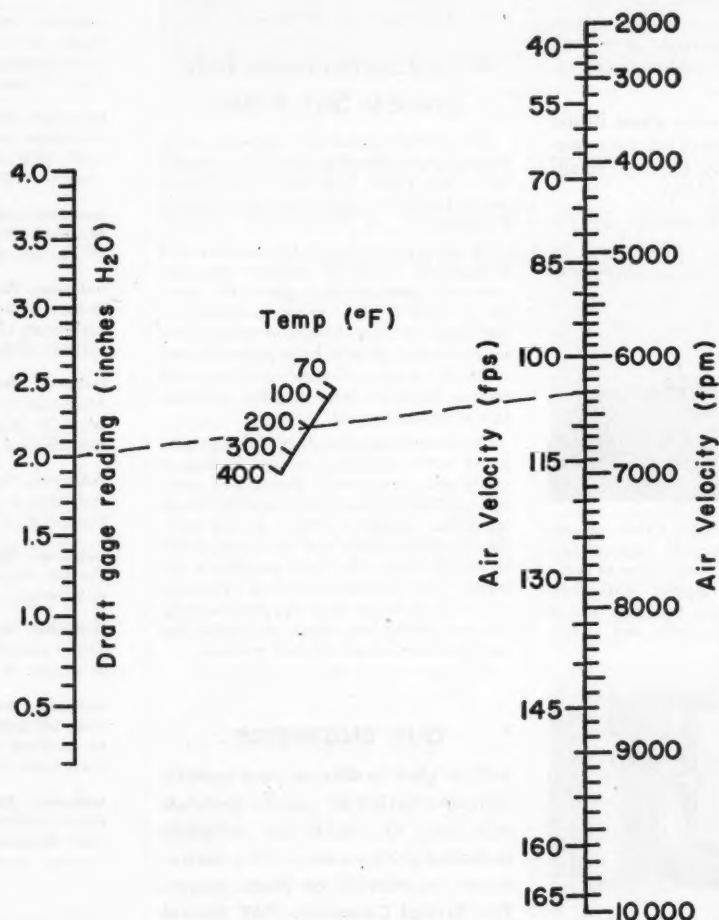
Nomograph by  
BILL SCHREMP Assistant Editor

Draft gage readings of differential pressure elements of flowing gas streams must be corrected for gas temperature. This nomograph relates gage reading to air velocity and air temperature — permitting quick and accurate corrections for temperature.

### Typical Example

If draft gage reads two inches of water and air temperature is determined at 200°F, what is the air velocity in feet per minute?

Connect 2.0 on draft gage reading scale with 200°F on temperature scale and read 6300 feet per minute on velocity scale (or, in feet per second, 110).



## a big line of SMALL packless valves



Packless valves are designed for tough applications, like critical high vacuums, corrosive or dangerous fluids and high temperatures. Our experience with these problems has helped us to design a packless valve line broad enough to suit many of these applications. As evidence may we present:

**The 431 Series** — a greatly improved version of the Hoke brass bellows needle valve offering extended, leak-tight service life . . . suitable for sampling systems and analysis equipment—brass bellows, stainless steel (blunt or vee) spindle in  $\frac{1}{8}$ " and  $\frac{1}{4}$ " pipe sizes.

**The 480 Series** — Globe or angle valves in brass or monel with phosphor bronze or monel bellows.

**The 440 Series** — for supercritical applications. An all stainless bellows valve with Teflon seat— $\frac{1}{8}$ " to  $\frac{1}{2}$ " pipe sizes. (Both 480 and 440 series have replaceable bellows assemblies.)

**The 411 Series** — All metal monel diaphragm valves with low internal volume and excellent service life.

For those of you who have special problems, modifications of these valves are available for high temperatures and pressures. You'll find us most receptive to your inquiries.

WE'VE JUST COMPLETED A NEW PACKLESS VALVE BULLETIN THAT WE'D LIKE TO SEND TO YOU. WRITE TO

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**INCORPORATED**  
Fluid Control Specialists  
145 S. DEAN STREET, ENGLEWOOD, NEW JERSEY

When inquiring check 7413A opposite last page

CHEMICAL PROCESSING



(Continued from page 75)

#### Indicator, flow

Package unit consists of orifice and rotameter in one. Differential pressure causes shunt flow through rotameter. Ball checks permit removal of rotameter while pipeline operation continues. (Figure 1070 chlorine flow indicator — 65)

#### Indicator, flow

Measures 0.07 to 0.7 gpm with 0.5% accuracy. AC output signal produced by sensing element rotor. Housing has 1/2" AN standard male flared connectors. Units can be operated in the temperature range from -300° to 450°F. (Flow Sensor Meters — 116)

#### Indicator, flow

Tapered metering tubes of rotameter can be changed without removing instrument from line. Designed for service at temperatures to 250°F with pressure ratings to 200 psi. (Sho-Rate "50" Purgemeter — 29)

#### Indicator, flow

Direct-reading meter uses moving vane to indicate flow. Unit is not position or vibration sensitive. Measures flow rate of fluids and gases. (128)

#### Indicator, flow, digital

Shows flow rate on five-digit register to provide high measurement accuracy and ease of reading. Null-balance indicator requires approximately 6 x 6" of panel space, can be adapted for mounting in hazardous area. (116)

#### Indicator, gas flow

Linearly indicates gas flow in volumetric units to 2000 psi. Designated so differential pressure across flow element is proportional to volumetric flow. (109)

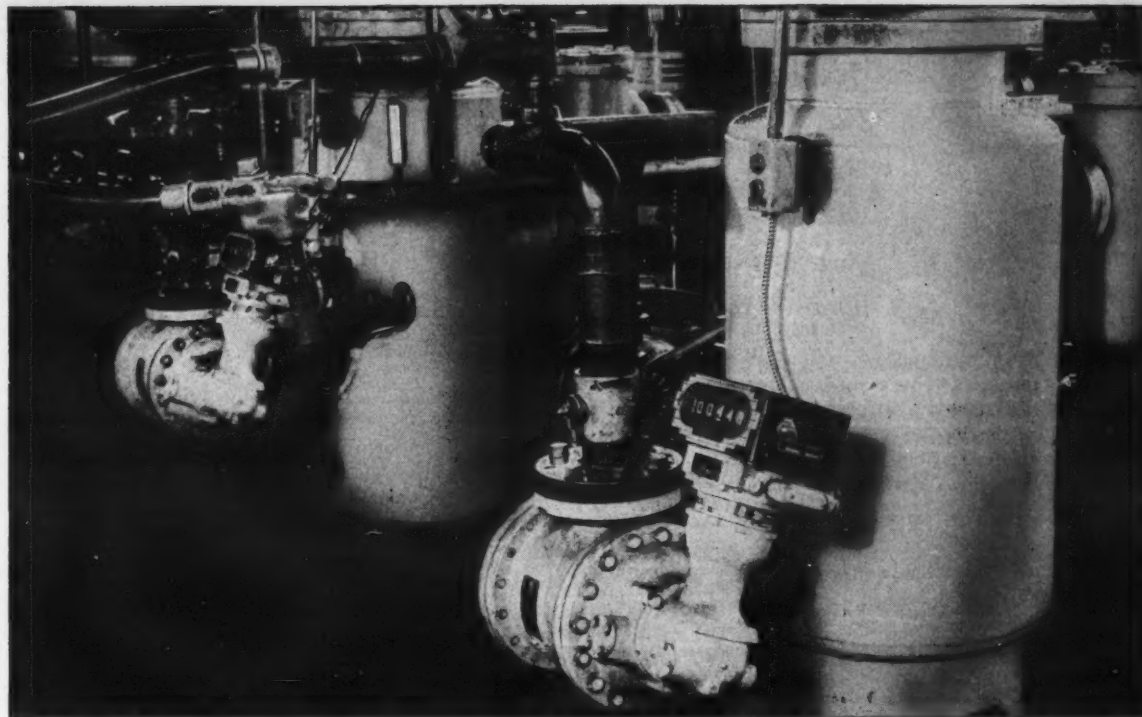
#### Indicator, level

Moving 20" scale is housed in 10 1/4" vertical gage. Uses hydraulic signal, can be 250 ft. from tank, no power needed. (96)

(Please turn to page 79)

### COLLECTING NOMOGRAPHS?

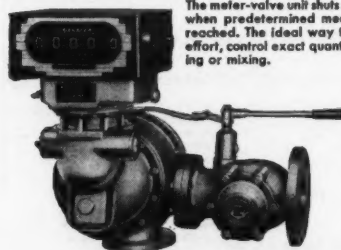
Because of frequent requests for copies of nomographs published in CHEMICAL PROCESSING, a limited number of reprints will be made available **starting with this issue**. If you want single copies of any or all of the four nomographs published here, check 7414 on form located opposite last page.



## Improve Your End Product, Cut Liquid Processing Costs

With Rockwell Industrial Meters you will eliminate the human error in handling liquids and compounding formulas. By supplanting time consuming weight or gauge methods, you'll save money. With a closed metered piping system you can avoid hazards and contamination. And remember, since Rockwell meters are available in a wide variety of metals (including stainless steel) you can measure most any liquid that can be piped. Let our engineers advise on your services. Write or use the handy coupon.

### Automatic Quantity Control



Provides Pre-Set Meter Shut-off Without Shock!

The meter-valve unit shuts off automatically when predetermined measured volume is reached. The ideal way to save time and effort, control exact quantities when batching or mixing.

## ROCKWELL INDUSTRIAL METERS

**Give Accurate Measurements—Fast!**

*Durable, All-Metal Construction In*

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Gentlemen:

I am interested in measuring \_\_\_\_\_ (Name of Liquid)  
Pipe Size \_\_\_\_\_"  
Working Pressure \_\_\_\_\_ psi Temperature \_\_\_\_\_ °F max.  
Max. Flow Rate \_\_\_\_\_ gpm Min. Flow Rate \_\_\_\_\_ gpm  
Your Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 7415 opposite last page





## Sizing Rotameters

By Prof. GEORGE M. MACHWART and JOHN F. MARCHATERRE  
Michigan College of Mining and Technology

Prediction of flow calibration for any fluid in a rotameter whose calibration for another fluid is known is facilitated by a specially designed float (such as that of the Fischer and Porter Co.)<sup>1,2</sup>. Actual flow is calculated from factors of viscous influence number, basic flow equation, and simplified flow coefficient.

Basic flow equation is —

$$W = KD_f \sqrt{W_f \frac{P_f - P}{P_f} \rho}$$

where:

	Value in Typical Example	Dimensions
K = basic flow coefficient	10	—
W = weight rate of flow	unknown	lb/min
D <sub>f</sub> = diameter of float	3	in
W <sub>f</sub> = weight of float	100	grams
ρ <sub>f</sub> = float density	7.86	g/cc
ρ = fluid density	1.0	g/cc

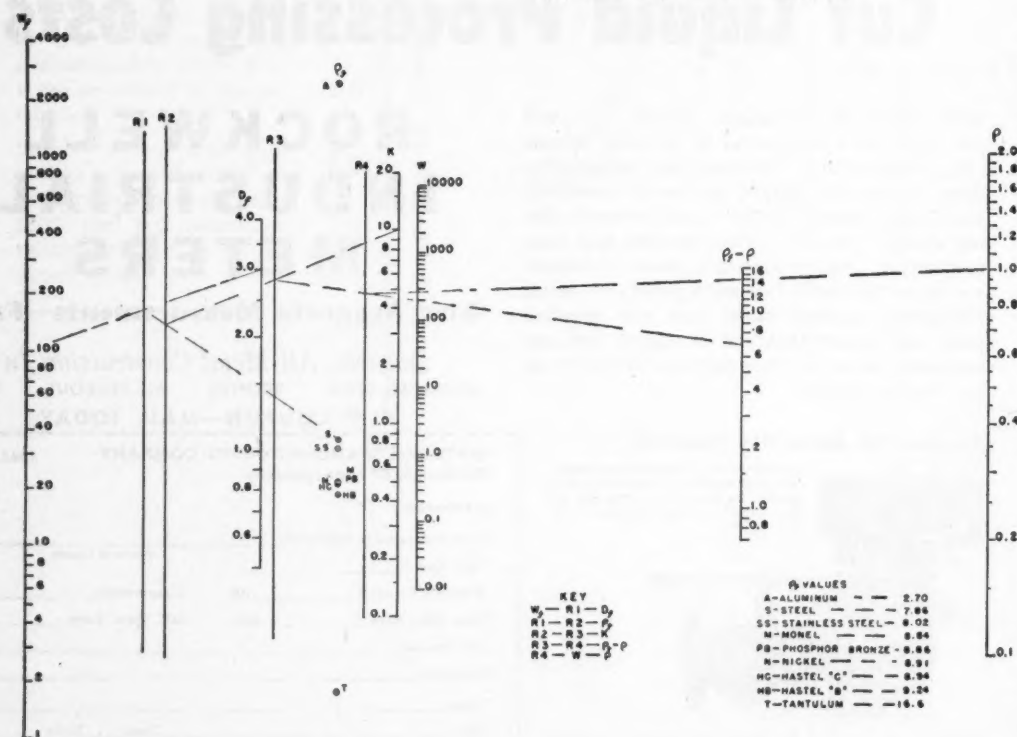
### Typical Example

To find weight rate from the values given above: Connect 100 on W<sub>f</sub> scale with 3.0 on D<sub>f</sub> scale and note intersection with R<sub>1</sub>. Connect R<sub>1</sub> point with gage point S (for steel float) which represents 7.86 on the ρ<sub>f</sub> scale. Note intersection with R<sub>2</sub> and connect this with 10 on K scale. Intersection of this line with R<sub>3</sub> scale is now connected with 6.86 on the ρ<sub>f</sub> scale to find a point of R<sub>4</sub> scale. Connect R<sub>4</sub> point with 1.0 on the ρ scale and read weight rate on W scale. Nomographic solution produces a weight rate of 280 to 285 lb/min compared with 279 lb/min found by calculation from the formula.

Values for the basic flow coefficient K can be found in Fischer and Porter Company's "Variable-area Flow Meter Handbook."

### LITERATURE CITED

- (1) "Calibrating and Sizing Rotameters," *Chem Proc*, Vol 15, No. 6, June 1952, pp 186, 188, 190
- (2) *Chem Eng*, Vol. 59, 1952, p 180



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Models available for inspection of cavities of any size from 1/8" diameter up, and in any length up to 70 feet. Precision optical systems and built-in illumination give bright, clear image for visual or photographic inspection.

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LT—Time Switches  
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CR—Cycle Repeaters  
R—Time Delay Relay  
RMC—Automatic Reset

**Lumenite Electronic Company**  
407 S Dearborn Street Chicago 5, Ill.

When inquiring check 7417 opposite last page

CHEMICAL PROCESSING

(Continued from page 77)

**Indicator, miniature**

Indicating, self-balancing potentiometer (case 5 x 5 1/4") for graphic panel or console mounting. Plug-in chassis for interchange with recording model. (27)

**Indicator, refractive index**

See also Refractometer

**Indicator, refractive index**

Gives continuous indication of refractive index of process stream. Sensitivity is  $1.2 \times 10^{-4}$  refractive index. (40)

**Indicators, sight flow**

For pipe lines 1/2" to 2" NPT. Transparent two window, and one-window models. End connections: of 1/2", 3/4" female and 1" male. (90)

**Indicator, smoke density**

Smoke density in stack measured by photocell. Calibration in percent smoke and Ringelmann number (FE-3 indicator — 57)

**Indicator, specific gravity**

For clean fluids. Sample is run through measuring chamber at fairly low (approximately 1/2 gpm rate). Output signal indicated and recorded in density units on electronic potentiometer, can be used for control. (116)

**Indicator, temperature**

For thermocouples or resistance thermometers, uses manual null balance for sensitivity of 0.02°F. Accuracy is  $\pm 0.25\%$  of full scale. (Manual balance indicator — 136)

**Integrator, flow**

For in-plant liquid handling and inventory transfer. Bulk and tank truck sizes covering flow range from 20 to 500 gpm. (124)

**Integrator, flow**

Integrates instantaneous values of static and differential pressure, extracts square root and totalizes results to 6 digits. (95)

**Integrator, flow**

Pneumatic integrator integrates continuously from 3-15 psi transmitter signal. Centrifugal, force balance principle; no cams. Panel mounted integral counter. (M/14-A Integrator — 67)

**Integrator, flow**

All ferrous design for ammonia. Sizes of 2, 3, 4, and 6" have max flow rate from 100 to 800 gpm. (All-ferrous Rotocycle — 124)

**Integrator, pneumatic**

Camless pneumatic integrator uses centrifugal force to cancel differential pressure factor. Gives 1/2% accuracy with 3-15 psi signal from flow transmitter. (Model 14A Pneumatic Integrator — 67)

**Integrator, running time**

Panel mounting miniature is 1 1/2 diam x 2 3/4"; shows time to 10,000 hours, accuracy of reading is better than 10 hours. 115 v AC power. (Model 7008 — 81)

**Leak detector**

See also Mass Spectrometer

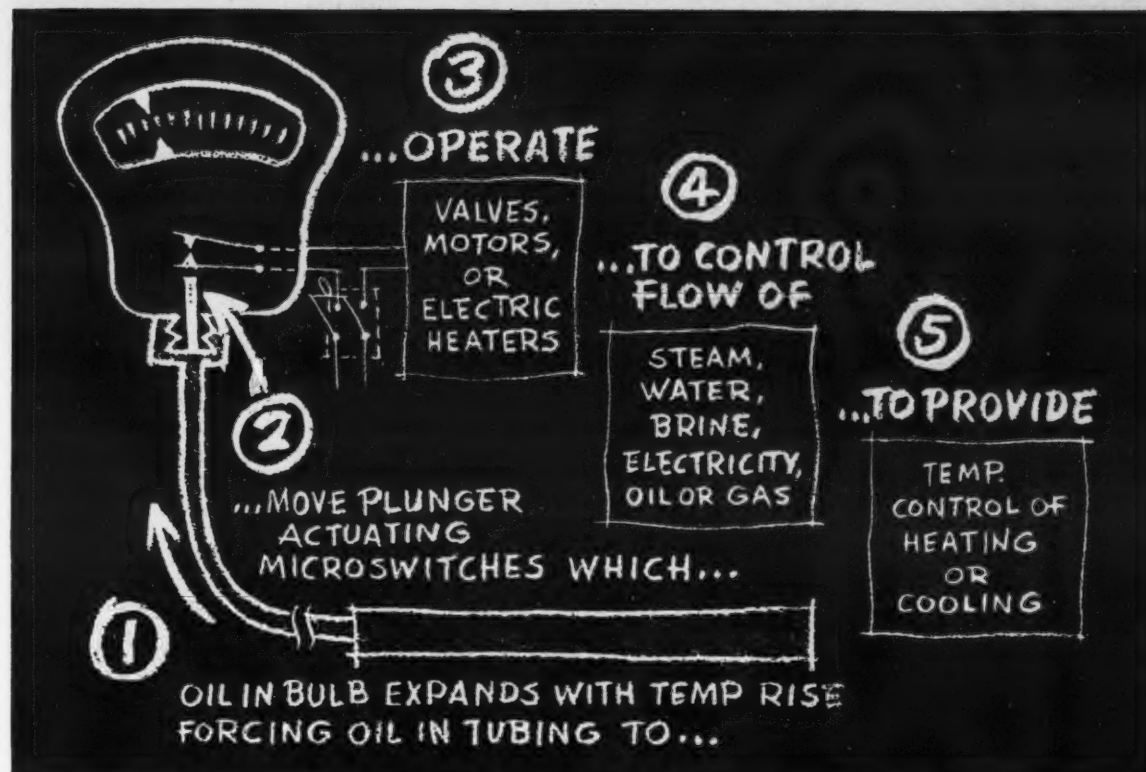
**Leak detector**

Shows existence or absence of minute leaks, determines rate, or finds exact location. Mass spectrometer uses helium or tracer gas. Detects one part in 300,000. (40)

**Leak detector**

Mass spectrometer leak detector uses radio frequency (Please turn to page 81)

Key numbers of this list refer to manufacturers shown on page 95 of this issue



## INDICATING Automatic Temperature Control

# It's simple...dependable!

That rough sketch above tells the story. It shows Sarco's simple electric indicating temperature control... and what it can do for you.

Really mighty simple, isn't it? Yet, it's adjustable, indicating and provides dependable accuracy to  $\pm 1/2^\circ\text{F}$ . No gadgets that call for a technician to read and repair! So simple, so trouble-free... maintenance is seldom, if ever, needed.

Turn one knob to change the temperature control setting. Large, easy-to-read scale shows you both the actual and the set temperature.

**SEQUENCE CONTROL**

And this Sarco electric temperature control is versatile... it offers you many sequence combinations such as:

- Step-heating
- Heating and cooling
- Wide limit control
- Temperature control plus operation of signal devices

Cost... only about \$100! It's good economy to specify AUTOMATIC temperature control for ALL control jobs, not just the big ones. So mail the coupon now for complete information.

## SARCO

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send information on your simple, inexpensive temperature controllers:

☐ Self-powered type for use on \_\_\_\_\_

☐ Electric indicating type for use on \_\_\_\_\_

Name \_\_\_\_\_

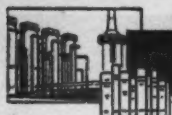
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When inquiring check 7418 opposite last page





## Viscous Influence Number For sizing rotameters

By Prof. GEORGE M. MACHWART and EDWARD L. SCARFF  
Michigan College of Mining and Technology

Where calibration of a rotameter is known for some fluid it can be found for others. The companion nomograph to this one (page 78) can be used to simplify this calculation. In order to make such a calculation, value of  $K$ , the basic flow coefficient, must be found. There values are given<sup>1, 2</sup> as a function of  $N$ , the viscous influence number. Viscous influence number may be calculated from —

$$N = \frac{\mu}{W_f \frac{p_f - p}{p_f} p}$$

where:

	Value in Typical Example	Dimensions
$N$ = viscous influence number	unknown	
$\mu$ = viscosity	1.0	cp
$W_f$ = weight of float	100	grams
$p_f$ = density of float	9.24	g/cc
$p$ = density of fluid	1.0	g/cc

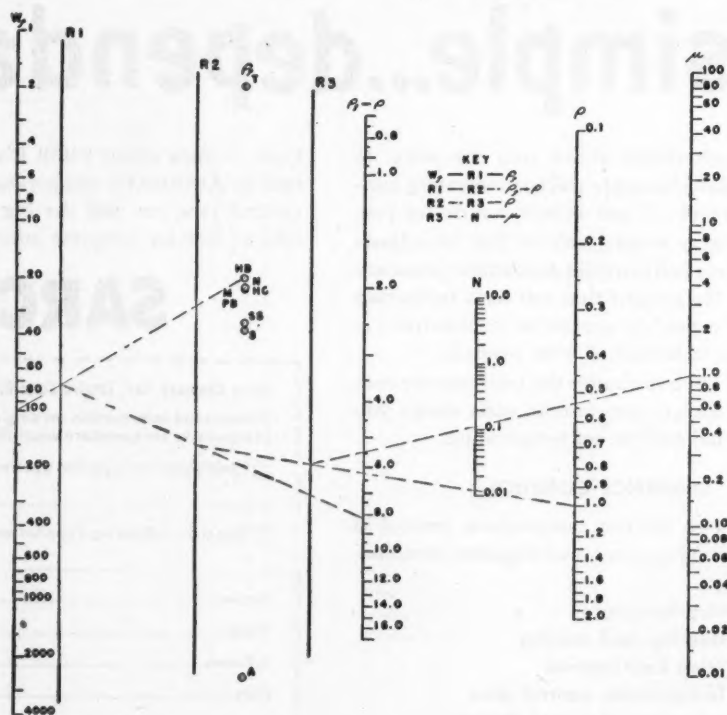
### Typical Example

To find viscous influence number, connect 100 on  $W_f$  scale with gage point HB (for Hastelloy B) which represents 9.24 on the  $p_f$  scale. Note intersection with  $R_1$  scale. Now connect  $R_1$  point with 8.24 on the  $p_f - p$  scale and note intersection with  $R_2$  scale. Connect  $R_2$  point with 1.0 on the  $p$  scale and note intersection on  $R_3$  scale. Connect  $R_3$  point with 1.0 on the  $\mu$  scale and read viscous influence number on  $N$  scale as 0.12. Calculation from the formula produces an  $N$  of 0.11.

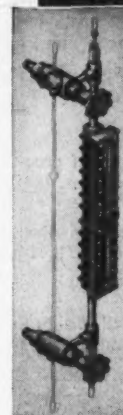
Viscous influence number can then be used to enter a plot of  $K$  vs  $N$  with parameters of  $D_t/D_f$  (ratio of tube and float diameters)<sup>1</sup> to find  $K$ , the basic flow coefficient.

### LITERATURE CITED

- (1) "Variable-area Flow Meter Handbook," Fischer & Porter Co., Hatboro, Pa.
- (2) "Calibrating and Sizing Rotameters," *Chem Proc*, Vol 15, No. 6, June 1952, p 188



get accurate level readings  
of hot or cold liquids



Reflex Type,  
Internal Tube  
Model

### ... with Jerguson Heated and Cooled Gages

Jerguson Heated and Cooled Gages are the answer if you have the problem of getting accurate level readings of liquids that boil or surge . . . or liquids that are heavy and don't flow at normal temperature.

These gages are specially designed and built to carry a cooling circulating medium to control boiling tendencies . . . or a heating circulating medium to speed the flow . . . so you get accurate readings. Available in external or internal tube models, reflex or transparent types, in a large number of sizes and pressure groups.

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for the Observation  
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When inquiring check 7419 opposite last page

## ELECTROTHERMAL TAPES for heating METAL or GLASS



Knitted Electrothermal heating tape can be stretched or squeezed to fit. Resistance bands are insulated on both sides by layers of knitted glass yarn for safety and efficiency. For 115 volts, AC only.

Catalog No. CP195-99A

W(in.)xL(ft.)	Watts	Amp.	Each	W(in.)xL(ft.)	Watts	Amp.	Each
1/2 2	36	0.5	3.50	2 2	120	1.5	8.00
1/2 4	72	1.0	5.50	2 4	240	3.0	13.00
1/2 6	108	1.5	7.50	2 6	360	4.0	18.00
1/2 8	144	2.0	12.00	2 8	480	5.0	30.00
1 2	72	1.0	5.50	3 1/2 2	210	2.5	12.00
1 4	144	2.0	8.50	3 1/2 4	420	5.0	19.00
1 6	216	2.5	11.50	3 1/2 6	630	7.5	26.00
1 8	288	3.0	15.00	3 1/2 8	840	10.0	45.00

More detailed information available on request.

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LABORATORY SUPPLIES • EQUIPMENT • REAGENT AND INDUSTRIAL CHEMICALS

When inquiring check 7420 opposite last page

CHEMICAL PROCESSING



(Continued from page 79)

and gives both audible and visual warning of air leaks in high-vacuum systems. (20)

**Leak detector**

Measures flow into, out of pipe or piece of process equipment. Difference is assumed to be leakage. Quantitative indication and can be used for alarm actuation. (Leak Detector — 116)

**Lights, indicator**

Two-terminal warning lights have built-in "press-to-test" circuit. Colors; amber, blue, green, red, white. (82)

**Manometer, diaphragm**

Compensated for changes in ambient temperature to 50°F. Has overrange protection to 30" WC. 302 stainless convoluted diaphragm in aluminum housing. Four models—range spans of 1" to 4" WC. (135)

**Manometer, precision**

Fisher-Zimmerli vacuum manometer reads to within 1 mm, estimates 0.5 mm throughout range of 0-300 mm Hg. (66)

**Meter, electrical**

VTVM provides accurate reading of small AC voltage from 0.001 to 300 v, response 10 cps to 2 mc. (Type 346 — 51)

**Meter, electrical**

Portable ohmmeter with built-in standardizing resistor for recalibration to ½% accuracy at center scale. Ranges 0-50/100/500/1000/5000/10,000/50,000/100,000 ohms. (Models 244 and 246 ohmmeters — 7)

**Meter, electrical**

Voltmeter with two sensitivities (25 Kohm/v and 50 Kohm/v) give open circuit potential of high impedance voltage sources. Ranges: 0-0.2/1/2/10/20/100 v DC. (Model 610 — 7)

**Meter, positive-displacement**

Four-way valve controls "downhill" metering of liquids and gases. Capacities are 3, 15, 75, and 375 ml/stroke, equivalent to 1, 5, 25, and 125 gph. Accuracy is ± 1%. (-Delta P pump — 125)

**Meter, purge**

Armored purge meter has all-metal construction. Pressure rating is 1500 psi ASA rating to 400°F. Uses magnet and follower. (Figure 245 Purge Meter — 65)

**Monitor, airborne radioactive particle**

For airborne beta-gamma radiation. Uses moving filter paper. Adjustable air flow and alarms. (112)

**Monitor, gamma radiation**

For monitoring gamma intensity at a given location, adjustable alarm. (112)

**Monitor, visual**

Electro-optical indicator with screen 3 x 4". Sensitivity is 0.032 ma/in scale deflection with 120 ohm damping shunt. (Model 20 Dynamic Visual Monitor — 36)

**Multimeter**

Has sensitivity of 20,000 ohms/volt for both AC and DC, built-in overload protection. (Type LM-1 — 121)

**Operator, pneumatic**

Produces stroke lengths to 2" and thrusts of 200 lb in either direction. Can be used with supply pressures to 100 psi. Signal range is 3-15 psi. (Model B-50 Pneumatic Operator — 39)

**Operator, valve**

Actuator (electric motor) positions control valves electrically using standard AC supply. Accepts signals from all types of electronic instruments. (39)

(Please turn to page 83)

THE MAN WITH THE pH<sup>\*</sup>**\*pH Data**

Tom Kehoe's files are bulging with case histories on industrial pH applications...and that's the way it should be, for among members of Beckman's Application Engineering staff, Tom Kehoe is the man with the pH data. To keep his files bulging, Tom Kehoe travels more than 30,000 miles a year. He visits all types of industrial processing plants throughout the country and asks all sorts of questions on pH problems.

His travels have three main purposes: to find new applications in industry for Beckman pH measurement and control instrumentation; to offer engineering assistance for the tough pH problems; and to bring back recommendations from process people all over the country on what new developments in pH instrumentation are needed.

Tom Kehoe, whose background includes 7 years with a major chemical producer and 5 years on the staff of a prominent consulting engineer, is one of more than a dozen members of Beckman's Application Engineering group. His col-

leagues are paralleling his pH activities in flow colorimetry, infrared analysis, mass spectroscopy and other stream analysis techniques.

Usually, a phone call or a letter to Tom Kehoe or one of his fellow engineers will solve your specific problem. If not, advance scheduling and arrangements can often bring an application engineer to your plant for consultation. Whatever your instrumentation and control problem, you can be certain you'll gain from the contact.

The address is Application Engineering, Dept. N16-11, Beckman Instruments, Inc., Fullerton, California.

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Instruments  
for process,  
analysis,  
and control.



pH Control System



Flow Colorimeter



Leak Detector



Micro-microammeter



Lison-Becker Infrared Analyzer

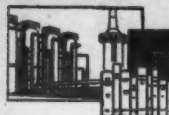


RF Gas Analyzer



Electrolytic Hygrometer

When inquiring check 7421 opposite last page



## Pressure Conversion

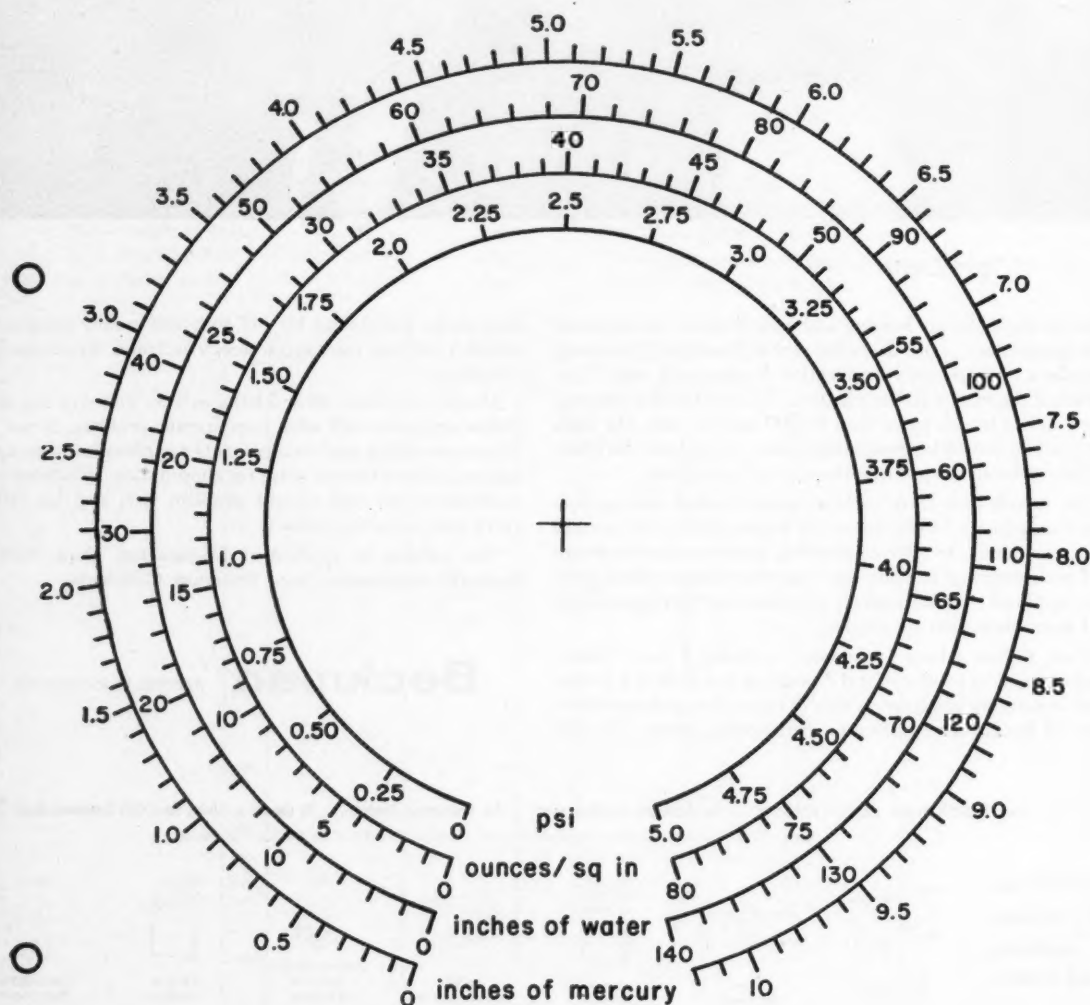
Data taken from tables by  
GENERAL BLOWER COMPANY

Nomograph by  
BRUCE FADER, Associate Editor

While conversion of pressure into various units is a simple operation, conversion of a large amount of data is tedious work and prone to error. This nomograph was designed to convert low pressures from one set of common units to any or all of

three others.

To use the nomograph simply place a straightedge so that it intersects the known value and lies across the center of the bullseye. Readings on all scales will then be equivalent.



## How to cut costs with Partlow Temperature Controls

Here's a handy guide for quick reference! Contains illustrations, brief descriptions, prices of Partlow Temperature Controls. Lets you see at a glance how low-cost Partlow Controls can fit into your production program. Controls listed cover temperature range from -30°F. to 1200°F. — for industrial heating and refrigeration.

Send for your copy today

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When inquiring check 7422 opposite last page

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SERIES 1400

### LIQUID DEPTH GAUGES

### ACCURATE and EASY TO INSTALL

Available in 4 Models, Petrometer Series 1400 Tank Gauges operate on the sound principle of hydrostatic pressure. No moving parts, no expensive electrical or electronic equipment. Large vertical scale gives accurate, easy-to-see reading. And construction features make installation easy.

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Bulletin 6004

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CORPORATION

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When inquiring check 7423 opposite last page

CHEMICAL PROCESSING

(Continued from page 81)

**Operator, valve**

Low time-constant control system for pneumatic cylinder actuators; amplifies pressure and volume output of positioner. (LTC Valve operator — 39)

**Operator, valve**

Three sizes: 50, 100, and 200 sq in with spring ranges of 0-30, 3-15, 5-25, or 6-30 psig. (Valve operator — 79)

**Operator, valve**

Self-contained operator for lever or butterfly valves. Electro-hydraulic. (5)

**Oscillograph**

Seventy-one-channel unit will respond to signals to 6000 cps. Chart rate variable in eight steps from 4 to 500 fpm. (Model PM-20 Oscillograph — 72)

**Pilot, pressure**

Mercury actuated with set point and process temperature indication on dial. Gives proportional, differential. Snap action controls from -40° to 1000°F. (79)

**Positioner**

Controls equipment with remote signal. Drive unit may be equipped with either pneumatic or electric receiver. Rotary shaft output with 60° travel. (122)

**Positioner, remote**

For accurate positioning and regulation of valves, dampers, requiring normal regulating torques to 140 lb-ft through 75° arc. (122)

**Positioner, valve**

Motion Balance positioner applies full supply pressure for high speed corrective action. Reversible. (Type C Vernier Valvactor Positioner — 67)

**Positioner, valve**

Self-contained electro-hydraulic operator for valves up to 8 inches and strokes ranging from ½ inch to 2 inches. Operates directly on signal from electronic controller. (5)

**Positioner, valve**

Controls valve action and mounts directly on valve yoke. Positioner is 6¾ x 6¼ x 5 5/16". Can be adapted to either air-to-lift or air-to-lower diaphragm. (67)

**Potentiometer**

Has reading window that centralizes 3 or 4 dial readings into one single row of digits plus a scale value. Used for measurement of DC voltage. (94)

**Potentiometer**

AC potentiometer is designed to BuOrd spec. Has low output impedance (less than 130 ohms) and high linearity. (.05% standard.) (Vernistat — 114)

**Potentiometer, linear and non-linear**

A potentiometric receiver-recorder-controller for DC pickups. Min range: 0-2 millivolts; max range: 0-20 volts. (Type WM55A Class E — 11)

(Please turn to next page)

Yes . . .

**CHEMICAL PROCESSING**

is "different!"

There are good reasons why!

See letter from the Editors, page 100.

wherever precise flow  
measurement is critical . . .

## Potter TURBINE TYPE FLOWMETER

ACCURATE, DEPENDABLE POTTER FLOWMETERS are being specified by more and more chemical processors each year for jobs that demand high reliability, high precision, low maintenance, extreme control precision. Available in sizes from ½" to 6" units, they measure caustics, acids, corrosives, unstable compounds, suspensions, super-refined liquids and other hard-to-handle liquids at temperatures up to 1200°F. and at pressures to 35,000 psi. Easily incorporated into complex control systems because of their linear output, Potter sensing units produce a signal that can be telemetered, fed into digital information handling systems, or measured directly to indicate or control flow rate or total flow. Find out how this unique approach to flow measurement can help solve your flow-control problems. Write for Bulletin S-1.

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Makers of "Potter Engineered" products

When inquiring check 7424 opposite last page



## INSTRUMENTATION & CONTROL

(Continued from preceding page)

### Potentiometer, slidewire

Self-balancing high-speed recorder; 12 1/4" stripchart. Full-scale chart traverse in 0.4 second. (27)

### Power supply, precision

Regulation 200 parts per million over 500-1500 volts, built for scintillation counter work. (120)

### Printer, strip chart

Print wheel can have 8, 10, 12, 18, or 24 positions. Remote control. Two print wheels if necessary. Operates on AC or DC voltage from 24 to 110 volts. Attaches to face at strip chart. (RI-3 Identichart — 126)

### Probe, capacitance

Controls level by relay. Detects interfaces. Adjustable from  $\pm$  fraction of inch to several feet. (Proximity relay — 61)

### Psychrometer

Unit is portable, motorized, battery-operated. Water reservoir contains water for one week. (68)

### Pump, controlled volume

Automatic proportioning of gas odorant to gas line, with all gas drive. (83)

### Pump, controlled volume

Double piston with adjustable volume and variable speed control. Pistons can be regulated independently. (108)

### Pump, controlled volume

Uses 3-15 psi signal to adjust capacity within 1%. Has air servo with feedback loop for specific low capacity flow control problems. (125)

### Pump, controlled volume

Vane guide check valves, volumetric accuracy guaranteed  $\pm$  1% from maximum to one-fifteenth of maximum displacement, simplex and duplex models from 0.11 gph to 35.6 gph, discharge pressures up to 1100 psig. (Model 1106 — 23)

### Pump, controlled volume

Delivers a uniform, pulsation-free flow at controlled rate, independent of feed pressure, viscosity, or vapor pressure. Accuracy within  $\pm$  0.25% of set rate. (23)

### Pump, controlled volume

Two models: Catalog No. LS-10 for capacities up to 2300 ml/hr at pressures up to 1000 psig; Catalog No. LS-20 for capacities up to 1040 ml/hr at pressures up to 2000 psig. Will vary flow from 0 to 100% automatically in response to pneumatic instruments. (Microflo pulsafeder — 93)

### Pump, high-pressure

Maintains constant flow at extreme pressures to 10,000 psi. Two double-acting hydraulic cylinders cause discharge at constant rate of flow. (62)

### Pump, mercury diffusion

20 liters per sec to ultimate pressure of  $10^{-4}$  mm. (120)

### Pump, vacuum

High vacuum, 20 liters per minute free air displacement, 0.1 micron ultimate vacuum, with motor for 115, 230 v, etc. (35)

### Pyrometer

Measures variations in temperature to 0.1°F. Infrared pyrometer covers range from ambient to 1000° C. (Pyrometer IR-1 — 129)

### Pyrometer

Gold-plated reflector cavity on telescoping extension permits temperature measurement to 0.5% accuracy in range from 100 to 2400°F. Thermopile and mv meter. (Land surface pyrometer — 123)



QUICK OPENING

LINEAR

PARABOLIC

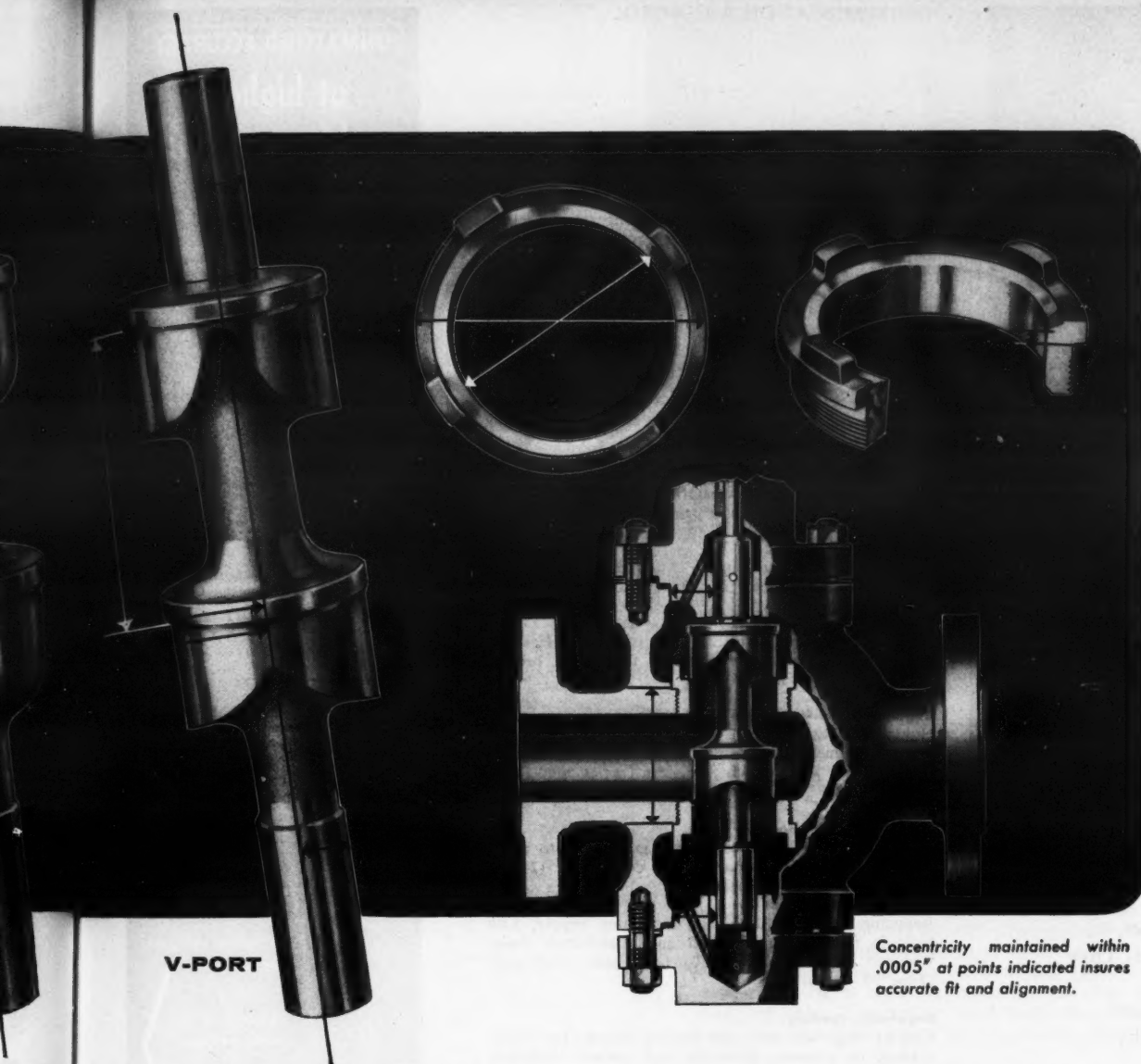
## INTERCHANGEABLE PARTS

### *An Important Factor in Uniform Quality of Masoneilan Control Valves*

You have a right to expect to be able to install replacement parts without recourse to a machine shop for custom fitting. When you use Masoneilan Control Valves you *get* parts that fit. For Mason-Neilan precision methods, automatic machines and specially designed

tools and gages, plus rigorous inspection, eliminate the maintenance man's headaches and reduce costly time out of service.

By maintaining this precise uniformity, Mason-Neilan makes certain that every valve will be in perfect alignment and that any



V-PORT

Concentricity maintained within .0005" at points indicated insures accurate fit and alignment.

parts you may install later will also be in perfect alignment.

Moreover, because valve plugs of comparable size but different flow characteristics are interchangeable, conversion is a comparatively simple operation.

These quality features,

added to other outstanding qualities of Masoneilan Control Valves, offer you low cost at comparable price — and over-all cost not price is the valid comparison.

Investigate the practical advantages of Masoneilan Control Valves.

Write for complete data.



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Appleton • Birmingham • New Orleans • Dallas • Seattle • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

When inquiring check 7425 opposite last page

## INSTRUMENTATION & CONTROL

### Pyrometer

Measures temperature of moving objects without touching them. Responds to 98 percent of temperature change in less than 1/2 second. In ranges of 800 to 1900°F, and 1000 to 2600°F. (High-Speed Radiamatic — 104)

### Pyrometer, controlling

For chromel-alumel, iron-constantan, and platinum -10% rhodium thermocouples. Controller operates on photo-electric principle. (89)

### Ratemeter

Two six-decade counters and frequency standard. Unit will count, determine frequency, or find period for a fixed count. Resolves 10 μsec; rates from 5 to 100,000 cps. (Type 12112 Ratemeter — 111)

### Recorder

Bulb or pressure actuated roundchart, electric chart drive. Ranges (composite) -200 to 1000°F, 0 to 10" WC, pressures to 2000 psi. (Design 2 Minicorder — 47)

### Recorder

Roundchart houses up to four receivers, each to position a pen. Pneumatic and electrical receivers may be used in same recorder. Electrical signal is 0 to 2 or 0 to 20 mv AC or DC. Pen speed of 5 seconds to cross chart. (Type WM55A — 11)

### Recorder

Self-balancing potentiometer for fast-changing variables. Full scale pen speed is 1/4 sec. Continuous, automatic standardization; plug-in amplifier; measuring circuit mounted on a single card. (1/4-Second pen speed ElectroniK recorder — 104)

### Recorder, flow

Permits measurement of range of 1000 to 1 through use of multiplicity of sensing elements to produce output signal. Can be provided with either manual or automatic range change feature. (116)

### Recorder, graphic

Portable graphic recorder has response time of 2.5 seconds for full scale. Span 100 mv. Accuracy 1%. Chart speeds 2 or 4 inches per minute, 4, 16, or 40 inches per hour. Uses 105-125 v AC at 60 cps. (140)

### Recorder, operation

Multiple point operation. Records 40 "on or off" operations from 6v or 115v source. Carbon record on plain ruled 10" chart paper. (43)

### Recorder, ratio

Electrical transducers for pressure, temperature, force can be used. Single-pen strip chart recorder or as single pen continuous ratio recorder. Full scale sensitivity as low as 5 mv. Two scales. (115)

### Recorder, stripchart

Range selector automatically switches to proper 110 mv span in range from 0 to 1010 mv. (Model 39 — 4)

### Recorder, stripchart

Self-balancing potentiometer recorder; 3-inch stripchart (case 5 x 5 1/4") plug-in chassis for quick interchange with indicating model. (27)

### Recorder, temperature

Two ranges for remote temperature recording: — 30° to + 50°F and 10° to 90°F. Portable. (Tempscribe Model TTR — 10)

(Please turn to next page)

List of instrument manufacturers by key number appears on page 95.





## electronic "brains" for industrial control

Do you need to measure and control weight, pressure, tension, torque or thrust? You can do it best with a Baldwin electronic SR-4® system—the system that's instantaneously responsive, highly accurate, always reliable and maintenance-free.

Easy-to-install Baldwin strain gage type transducers are the load-sensing elements. They transmit signals to Baldwin indicators, recorders, controllers, or other appropriate instrumentation . . . i.e., output can also be fed to a digital printer or computer.

Closed-loop SR-4 systems are engineered to meet your specific requirements. Find out now how these electronic "brains" can solve *your* control problems. For your copy of general bulletin 4300, write Dept. 2706, Electronics & Instrumentation Division, BLH Corporation, Waltham, Massachusetts.

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Pelton • Standard Steel Works

When inquiring check 7426 opposite last page

## INSTRUMENTATION & CONTROL

(Continued from preceding page)

### Recorder, temperature

Measures, records from  $-40$  to  $140^{\circ}\text{F}$ . Miniature portable recorder allows fast range changing. (144)

### Recorder, universal

For DC voltage, current, resistance, temperature ( $-100^{\circ}$  to  $1000^{\circ}\text{C}$ ) pH, pressure, vacuum, rotational speed, illumination, transmittance, reflectance; 11 speeds (3.75 to 60 inches/hour); 115 v 60 cps. AC. (66)

### Rectifier, silicon

Plug-in rectifier units supply DC for electronic control and instrument systems. Fits octal sockets, interchangeable with tube. (Plug-in Silicon Rectifier — 25)

### Refractometer

Measures percentage of total dissolved solids. Accuracy to 0.1 percent. (2)

### Refractometer, process

Measures difference in refractive index between liquid standard and flowing liquid process sample. (40)

### Regulator, flow

Pressure actuated condensing water regulating valve, with continuous adjustment from 60 to 260 psig. (102)

### Regulator, flow

Controls rate of flow with accuracy of  $\pm 3\%$ . Has cast iron body for working pressures up to 125 psi, bronzed-lined throat section. (23)

### Regulator, instrument air

Holds pneumatic pressure to within 1/10 of 1%. Uses Ni-Span C measuring element. 25 and 60 psi standard ranges for  $\frac{1}{8}$  and  $\frac{1}{4}$  inch pipe sizes. (Series 5000 Regulators — 22)

### Regulator, instrument air

Provides filtered supply of power gas or air to pneumatically operated instruments or controllers. (24)

### Regulator, instrument air

Reducing valve for 150 psig, maximum supply, with built in relief, filter, dripwell and push-button drain. Reduced ranges, 0-10,  $\frac{1}{2}$ -30, 1-60, and 2-100 psig. (Type 55 — 34)

### Regulator, loading

Line of single and dual gage loading stations for remote loading or pressure balancing and control. Available with automatic-manual switch. 150 psig, maximum air supply, loading ranges 0-2, 0-10, 0-30, 0-60, and 0-100 psig. (Type 54 — 34)

### Regulator, vacuum

Automatically maintains a lower vacuum at valve inlet than at source on valve outlet. (D-51 — 34)

### Regulator, voltage

1.25 amp, continuously adjustable from 0-120 volts when input is 115 volt 50-60 cycles AC. Compact: 4" x 4" x 4". (66)

### Regulator, voltage

Magnetic amplifier with silicon reference diode. Load to 1 kva, 55-65 cps, accuracy of 0.5%. (Model MA1000S — 132)

### Regulator, water temperature

Four models cover water temperatures of 60-110, 85-135, 110-160, and 135-185°F and line sizes from  $\frac{3}{8}$  to 1". (T-44 regulators — 127)

### Relay, alarm

Signals when process pH varies beyond selected upper

## UNMATCHED ACCURACY

## at highest working pressures

At pressures up to 2000 psi, this Meriam Manometer provides critically accurate flow or differential pressure measurement. Constructed of solid bar stock steel, all parts are precision fitted, hand lapped. Each unit is cold hydraulic tested to 5000 psi.



Meriam provides basic simplicity . . . and permanent accuracy in instrumentation . . . extending to the highest operating pressures.

★ Heat treated glass bar cover

★ Stainless steel backing bar

★ Ranges to 70 inches mercury

Write for Bulletin C-12.

*Meriam Manometer Instrumentation*

*for pressures, vacuums,  
flows, liquid levels*

# meriam

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When inquiring check 7427  
opposite last page

CHEMICAL PROCESSING



and lower limits. Designed for surface or bench mounting. (94)

#### Relay, electronic and photocell

Can be used as either a photocell relay or as an electronic relay. Electronic relay operates whenever resistance between control posts is less than 2 megohms. Contacts deliver 115 volt, 5 amp. Switches to photoelectric control by toggle switch. (14)

#### Relay, ratio

For the pneumatic control. Produces linear change in pneumatic output signal when using 3-15 psi. (77)

#### Relay, miniature mercury

Capacity of 20 amps at 115 volts, 50/60 cycles. Mercury-to-mercury contacts are totally-enclosed. (Minirelays — 53)

#### Relay, sensitive

Meter relay, closes contacts at ranges from 0-5  $\mu$ a to 0-50 amp or 0-5 mv to 0-500v. AC or DC except for low millivolts in DC only. Adjustable contact settings. (Model 461 panel meter — 6)

#### Relay, sensitive

Relay trips with 3 microamperes. Handles loads to 60 amperes or 3 hp at 115v AC. Closure time is 35 milliseconds. (Micrelay — 53)

#### Relay, sensitive

Gives limit-control of temperature, pressure, other variables measured electrically. Sensitivity from 0-20  $\mu$ a to 0-50 amp. Accuracy is 2%. Contact ratings are 5-25 ma, 75-125v DC. (Model 255-C Meter-Relay — 6)

#### Relay, sensitive

High-speed polarized relay for low-power application; SPDT or DPDT models. Typical characteristics: tem-

(Please turn to next page)



"The chief must be getting nearsighted. He thinks we replaced the broken clock."

A. A. Schilling, Research & Development Dept., The Remington Arms Co. Inc., Bridgeport, Conn., gets credit for this cartoon idea.



## Is SCHOOL OVER... for any of us?

Those of us in process control work realize that learning, too, is a continuous process. If we are to produce high quality products at minimum cost, we must apply the *right* tool for each process control job. Before we can select intelligently, however, we must learn and understand how all available tools work and how each is used. A rapidly expanding and changing technology further complicates the picture, with the result that school is never really over... for any of us.

An excellent instrument "refresher course" is available this year; the 11th Annual Instrument-Automation Conference and Exhibit, to convene at the New York City Coliseum, September 17th to 21st.

Instrument manufacturers will exhibit and describe their latest equipment. Classroom sessions will be conducted daily. Instrument users and manu-

facturers will learn more of product uses, and needs. Milton Roy Company will be there, at booths 714, 715 and 716. We hope that we will have the opportunity to explain our equipment to you, and its application to your specific chemical metering needs. If you can't attend, then write for the "textbooks" listed below. They contain the "what", "why" and "how" of controlled volume pumping and, probably, the economical solution to your chemical feed problem.

**Bulletin 455** "Controlled Volume Pumps in Paper Making"

**Bulletin 953** "Controlled Volume Pumps in Industrial Water Treating"

**Bulletin 1253** "Controlled Volume Pumps in Process Instrumentation"

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When inquiring check 7428 opposite last page



MODEL  
"M"  
SERIES

**Marksman tubeless electronic potentiometer strip chart RECORDER for recording and controlling such variables as temperature, speed, strain, pH and many others.**

- ★ No vacuum tubes. Sensitivity of 5 micro-volts or less.
- ★ Potentiometer for thermocouple (TCB protected) or radiation pickup, Wheatstone bridge for resistance pickup.
- ★ Full selection of standard scale ranges . . . 11" calibrated chart width.
- ★ Selector knob changes chart speed . . . 5 speeds per unit without gear change.
- ★ Single or multi-record units available.
- ★ Equipped for 115 or 230 volts — no transformers needed.
- ★ Additional features: Automatic standardization . . . cold junction compensation for thermocouple use . . . battery condition indicator for potentiometer . . . built-in chart saver . . . designed for standard 19" relay rack.

INSTRUMENT  
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625

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Write for Bulletin M.

the trend is to WEST



When inquiring check 7429 opposite last page

## INSTRUMENTATION & CONTROL

(Continued from preceding page)

perature range,  $-55^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ ; operating shock, 30G, 11 milliseconds duration; vibration, (10-55 yr) 10G; contact ratings, up to 35, 45 microamps; pull-in and drop-out time as low as 200 microseconds. (27)

### Relay, time delay

Two models. Will maintain repeat accuracy within  $\pm 1/4$  of 1% of full scale on ranges to 30 sec,  $\pm 1/2\%$  on longer ranges. Contacts rated at 15 amp. (Type 412 and 422 time delay relays — 42)

### Rotameter, purge

Armored purge meter has all-metal construction. 1500 psi ASA pressure rating. (65)

### Scale

One-to-one ratio precision industrial scale with visual indicator. Net weigh hopper and automatic cutoff controls. Over-under indicator for visual checking. (60)

### Scale

To provide the transmitting unit for remotely recorded weights in digital form. (137)

### Scanning system

For automatically converting the reading of a graduated dial into digital form and transmitting the signal to a punch, typewriter or other office machine. (Scanning System — 137)

### Scanning system

Checks 32 points every 120 seconds, sounds alarm and indicates high or low points, accepts electrical signal. (Control center — 15)

### Scanning system

Set up for 6, 12, 24, or 48 points, accepts electrical signals. One point/sec max. (Indicating scanning — 123)

### Slope reader

Computes rates of change directly on curve. (Gerber Derivimeter — 74)

### Spectrogammaeometer

For analyzing gamma spectra. (Spectrogammaeometer — 120)

### Spectrogammaeometer

For gamma detection. Sensitivity three micro microcuries of gamma emitter. (Spectrogammaeometer — 120)

### Spectrogammaeometer, recording

Plots out and enables user to identify radioisotopes. (Spectrogammaeometer — 120)

### Spectrometer, continuous scanning

For analysis of radioisotope samples for identification and determination of amount of radioactive material present. (138)

### Spectrometer, infrared

Single-beam recording prism-grating instrument for entire infrared region. High resolution, high energy per spectral slit width and freedom from scattered light. Band separations of better than  $0.8\text{ cm}^{-1}$  have been observed with the instrument. (114)

### Spectrometer, NMR

Rapid, non-destructive analysis of more than 100 isotopes of 65 elements. Moisture determinations in one minute accurate to 0.2%. (114)

### Spectrometer, radiation

Nuclear fuel encapsulation breakage is read out on chart recorder. (120)

### Spectrometer, ultraviolet

Double monochromator reduces stray radiation to an almost negligible value. Records in linear transmittance or absorbance. Continuously variable scanning speeds,

## UNITIZED WEIGHING



Only WEIGHING COMPONENTS offers a packaged unit that:

- 1 Fits your present or proposed conveyor system with little if any modification.
- 2 Responds only to vertical weight—not affected by side thrust, load placement or pile-up.
- 3 Measures rate and/or totalizes.
- 4 Offers high sensitivity with rugged simplicity.
- 5 Has automatic tare weight adjustment.
- 6 Electrical or pneumatic operation—your choice.
- 7 Use for indicating, recording and/or controlling . . .
- 8 Highest accuracy — no knife edges, levers or springs.
- 9 Lifetime construction.
- 10 Safe for all locations.

Full information available.  
Send for Bulletin 11.



**WEIGHING & CONTROL COMPONENTS, Inc.**  
64-A Fulmer Ave., Halboro, Pa.

When inquiring check 7430  
opposite last page

CHEMICAL PROCESSING



repetitive running and a 100% line compensator. (Spectracord — 114)

#### Spectroscope

Spectroscope is self-contained. For rapid identification of 61 elements; also semi-quantitative; for 115 v 50-60 cps AC. (Spectral — 66)

#### Standard, resistance

Resistance box has range from 0 to 999,999 ohms and 0 to 99,999 ohms, in steps of one ohm. Nominal ratings of individual resistances are  $\frac{1}{2}$  watt. Resistance accuracy at 25°C is  $\pm 0.005$  ohms. (41)

#### Switch, diaphragm

Senses and actuates on differentials of 0.5" WC from 0 to 45" WC. Reference must be air or inert gas. Variable pressure may be liquid or gas. (Switch 227 — 16)

#### Switch, high-speed rotary

Motor-driven commutator unit. Thermocouple switching, telemetering, electronic gating and computer. (87)

#### Switch, miniature toggle

Unit has positive action for on-off. Minimum life expectancy of 100,000 cycles on contacts. SPDT, DPDT, and 3PDT. Electrical ratings 5 amp at 125/250 v AC. (Model B-T1-1 Milli-Switch — 103)

#### Switch, miniature toggle

Indicates last circuit operated. Consists of 3 SPDT basic switches and one SPDT "memory" switch. Snap acting contacts for 5 amp, 125 or 250v AC. (Memory — 104)

#### Switch, selector

Single cabinet selector handles up to 144 points for thermocouples or resistance thermometers. DPDT or 4PDT. (136)

#### Switch, vacuum

Air-vacuum interlock switch to assure specific vacuum. On-off differential of approximately 0.15" to  $\pm 0.05$ " WC. Electrical ratings SPDT, 15 amps, 120-250v. (48)

#### Telemetering system

Electronic transmission system for pressure, temperature, flow, differential pressure, etc. Receivers (5 x  $\frac{5}{8}$ " ) recorders and indicators. Transmitters combine sensing element and differential transformer. (Telemetering system- 27)

#### Tester, Automatic Reid vapor pressure

For blending ASTM gasoline. Features maximum butane utilization, in-line blending control and eliminates the need for one out of every three operating tanks. (Automatic Reid Vapor Pressure Instrument — 117)

#### Tester, flash-point

For "open-cup" tests of volatile liquids flammable below 175°F; for 115 volt 60 cycle AC. (66)

#### Tester, flash point, automatic

Automatically rejects distillate fuel sample flashing below any pre-set temperature within range 110°F to 140°F. (Tester — 117)

#### Tester, impact-flexibility

Determines relative flexibility of paint, varnish, or enamel film expressed as percentage elongation. (69)

#### Tester, moisture

Indicates percent moisture of sheet materials—plastic, hardboard, asbestos-cement siding, roofing materials, sheet rock. Operates on high-frequency power absorption and gives indication in 3 seconds. (Moisture Register — 106)

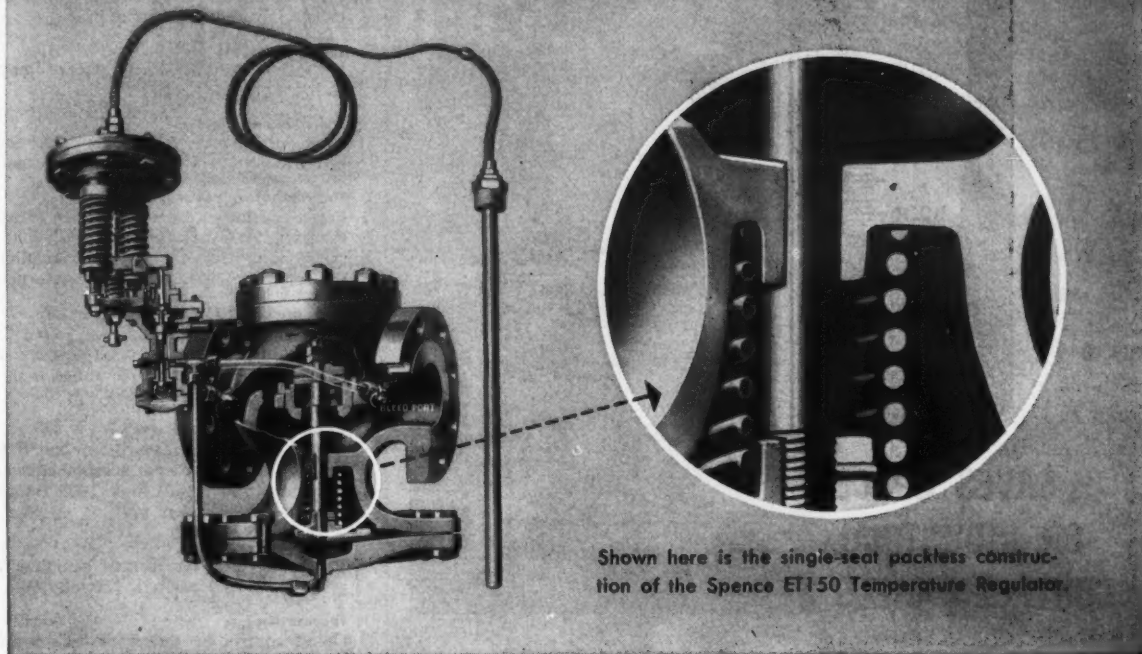
#### Tester, odor

Measures odorant in gases — reads in percent gas by volume. Battery operated. (45)

(Please turn to next page)

## VALVE TIPS:

# Advantages of Packless Construction in Temperature Regulating Valves



Shown here is the single-seat packless construction of the Spence ET150 Temperature Regulator.

One of the biggest headaches in regulating valve maintenance is repacking stuffing boxes.

How often a valve needs repacking, how much time it takes, and the cost of the system downtime all vary with the construction of the regulator and the service it's used for. No matter how you calculate all these variables it's still a headache—and an expensive one.

In the temperature regulator shown above (Spence Type ET150) stuffing boxes are eliminated. This is done by what is known as "balanced" diaphragm construction. You can see in the cutaway drawing that pressure is applied to both sides of the large metal diaphragm. The upper side is exposed to delivery steam pressure and the lower side is exposed to loading pressure applied by the pilot. When the pilot closes, both delivery pressure and loading pressure are equalized through the bleedport and connecting tubing.

This construction not only does away with repacking problems, but it makes

possible additional savings as well. For example, you will note in the sectional blow-up that this design eliminates a closely fitted stem and guide. Dirt or other foreign matter doesn't have much of a chance to lodge between these parts and cause sticking.

Another cause of binding or sticking, uneven expansion of closely fitted parts, is also eliminated with this design. In addition, valve stem wear is reduced for the same reason.

Lower maintenance is not the only advantage of this packless construction. Accuracy of regulation is also improved because friction due to a stuffing box, dirt, or uneven expansion is not a problem. The large, balanced metal diaphragm is more sensitive to slight changes in pressure.

### Guaranteed Not To Wiredraw

If seats and discs are cut by steam (wiredrawn) the loss of steam through these grooves can be another expensive item — directly charged against the

regulating valve. Fortunately, you can eliminate these costly leaks by specifying a temperature regulator that is guaranteed not to wiredraw.

Spence makes such a guarantee because their seats and discs are made of SECO Metal. Over 20 years experience with this special alloy has failed to produce a single case where a SECO Metal seat or disc had been cut by steam. All that's required is an approved strainer located ahead of the regulating valve. Expensive steam leaks just can't happen with this combination of SECO Metal and single-seat design.

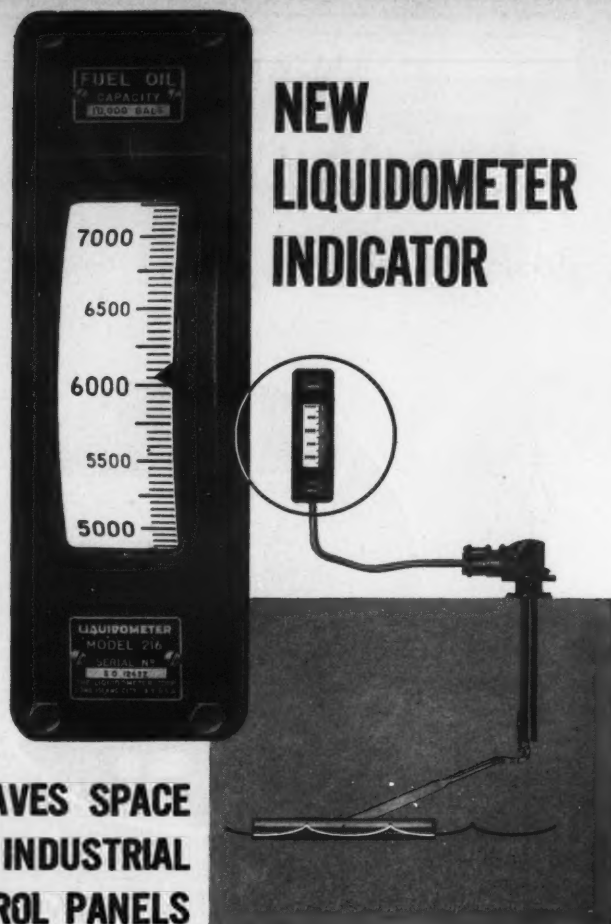
If you would like to have more information on Spence Temperature Regulators, drop us a line and ask for Bulletin T150. It gives more detailed information on these and other Spence design features. Piping layouts and helpful information on the installation of temperature regulators are also included. Write for your copy today.

SPENCE ENGINEERING COMPANY, INC.  
Walden, New York

SE 140

When inquiring check 7431 opposite last page





## Twenty-inch dial in 3x10 1/4" case permits close readings

The new Liquidometer Model 216 Indicator gives the plant engineer a reliable, automatic reading of storage tank contents. Available in either vertical or horizontal design, the compact and highly readable Model 216 Indicator makes possible multiple installations on crowded control panels.

Teamed with Liquidometer's time-tested hydraulic transmission gaging system, the new indicator provides instantaneous remote indication of liquid levels—automatically. No outside power source is required. Virtually any liquid may be measured, and the indicator can be located up to 250 feet from the tank.

Engineered for dependability, the Liquidometer gaging systems highlight these design features:

- Maintenance free
- Integral temperature compensation
- Ease of installation—requires only one 2" diameter tank opening
- Safety—all gages Underwriters approved for hazardous liquids

For further details on the new Model 216 Indicator, write Dept. H for Bulletin 532.



### THE LIQUIDOMETER CORP.

SKILLMAN AVENUE AT 36th STREET  
LONG ISLAND CITY 1, NEW YORK

When inquiring check 7432 opposite last page

## INSTRUMENTATION & CONTROL

(Continued from preceding page)

### Tester, viscosity

Calibrated tube for timed ascent of bubble. Range 7-2000 strokes; accuracy 2%. (69)

### Thermistor, precision

Responds to small temperature changes with accuracy of 0.001°C or better. (64)

### Thermocouple

Primary element for measurement of temperature from -300 to 1850°F at pressures to 3000 psi. Provides protection in case of well rupture. (38)

### Thermocouple

High temperature TC in swaged magnesia insulation with metal sheath. (1)

### Thermometer, glass

Have permanent markings. May be used safely in alkaline solutions, chemicals, acids, solvents. (28)

### Thermometer, resistance

For temperatures from 32 to 1300°F with 1% or better accuracy. Resistance changes from 100 to 359 ohms in range from 32 to 1380°F — no amplification is needed. (Model 242P resistance temperature detector — 54)

### Thermometer, resistance

Controls as well as measures;  $\pm 0.5^\circ\text{C}$  accuracy from  $-100^\circ$  to  $250^\circ\text{C}$ , and  $\pm 1.0^\circ$  above  $250^\circ$ . No range switches — the entire  $376^\circ$  range is on one continuous scale. 115 v 60 cps AC. (66)

### Thermometer, signal eye

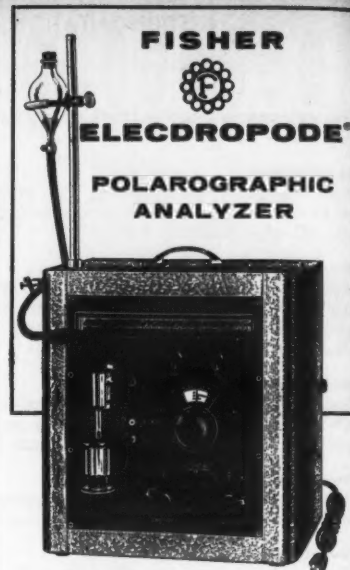
Bi-metallic unit is readable up to 50 feet, shows temperature deviations from acceptable standards. Available in ranges from  $-160^\circ$  to  $+1000^\circ\text{F}$  and in stem lengths from  $2\frac{1}{2}$  to 72 inches. (49)

### Thermometer, tank

Plastic cup-case for manual sampling and taking temperatures. Cup capacity is 120 ml. (142)

### Thermostat

On-off control by means of differential expansion ele-



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QUALITATIVE  
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ORGANIC AND  
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• EASY TO USE**

The Fisher Elecdropode is a simple-to-operate instrument capable of detecting minute quantities of ions or radicals and measuring these quantities within precise limits. The Elecdropode operates efficiently in the range of 0.01 to 0.000001 equivalents per liter; less than 10 ml of solution is required, and the sample is not altered during analysis. When necessary—extensive analyses may be made with as little as 0.005 ml of solution. Get details now about the Fisher Elecdropode and other analytical instruments.



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**THIS BULLETIN  
WILL HELP YOU**

Bulletin FS-250 details Fisher apparatus for analysis by electrodeposition and outlines the applications and advantages of each type.

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America's largest Manufacturer-Distributor of  
Laboratory Appliances and Reagent Chemicals

When inquiring check 7433  
opposite last page

CHEMICAL PROCESSING

ment actuating snap-action switch, SPST or SPDT, 15 amp, 125-250-460 v AC. Range 35-600°F. (Model A-1S-160 — 32)

#### Thermostat

Miniature unit,  $2\frac{1}{2}$  x  $\frac{1}{4}$ " diam, has SPST NO or NC action for 1 amp 115 v AC with temperature range of -50 to 500°F. (Thermoswitch — 64)

#### Thermostat, local-bulb

Uses bellows assembly and rod linkage enclosed in liquid filled cylindrical housing. Three temperature ranges: 50-300°F, 0-250°F, and -50 to 200°F. Snap action switches. (64)

#### Timer

A 4 x 4 x 4" shut-off apparatus for instruments & appliances; in 0-60 minute 15 amp 115 v 60 cps AC and 0-60 minute 10 amp 230 v 60 cps AC. Also 0-24 hour 15 amp 115 v 60 cps AC and 0-24 hour 10 amp 230 v 60 cps AC. (66)

#### Timer

Electronic type for counting predetermined time or elapsed time. (12)

#### Timer

Electrical on-off control of 48 circuits on standard 24-hour cycle in 15-minute increments. Handles 1 kw at 115/230 v AC. (145)

#### Timer

Electronic timer for ranges of 0.06 sec to 1 min. DPDT 10 amp relay 110 or 220 v AC. Contacts transfer at end of time range. (71)

#### Timer

Running time unit records periodic running or operating time of a condition or process on the same circular chart with the related measured and/or controlled variable. Accuracy:  $\pm 6$  sec. (Type WM55A Class TB — 11)

#### Timer

Synchronous motor timer for ranges of 1 min to 24 hr 10 amp contacts up to 5PDT. Contacts transfer at either beginning or end of timer. Many features available. (71)

#### Timer, electrical

Pushbutton timer has timer elements, signal light, solenoid in one case. Has automatic reset. Solenoid valve can be used on air pressures to 50 psi. (D494A Meritrol Timing Unit — 58)

#### Timer, electronic

Measures time intervals, period intervals, frequencies, frequency ratios, phase shift or may be used as an electronic counter with manual on-off control. Maximum accuracy of  $\pm 1$  microsecond. (21)

#### Timer, interval

Synchronous motor driven, push button start, automatic reset, adjustable. 15 amp 115 v. Ranges 6 sec through 24 hr. (42)

#### Timer, interval

Repeat cycle, electronic. For life testing or repetitive operations. Adjustable on and off times. Time intervals to 12 seconds. Plug-in relays. Back of panel or bench mounting. SPDT 8 amp 115 v load relay contacts. (63)

#### Transformer, variable

Adjustable transformer to reduce input voltage from 115 or 230 v AC. Rated output current is 6 amp. Special assemblies of 2-gang and 3-gang models. (Type W5 Autotransformer — 73)

#### Transmitter

Absolute pressure transmitter for use with pneumatic receivers and controllers; minimum range as low as

(Please turn to next page)

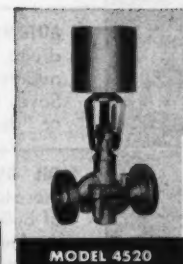
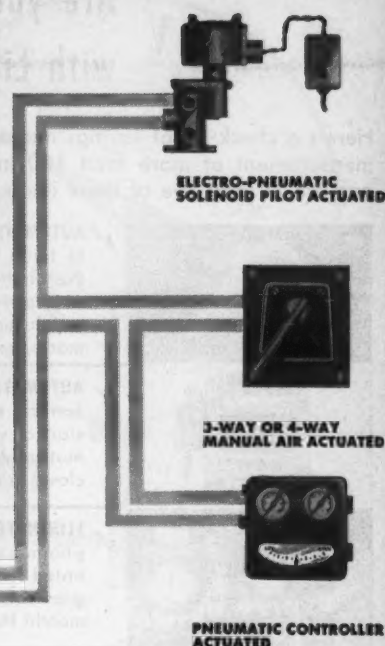
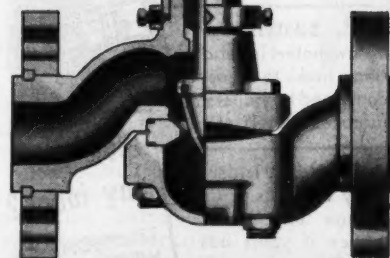
# For Remote Shut-off Applications...

## ANNIN CYLINDER VALVES

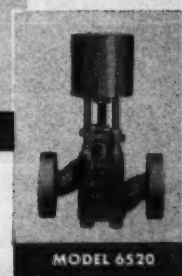
### provide the complete answer!

...with these advantages:

- Positive shut-off
- Fast action
- Spring to open or Spring to close
- Globe, angle & 3-way bodies
- Carbon steel and all cast and forged alloys available
- Metal seats for high temperatures



MODEL 4520



MODEL 6520

and absolute shut-off dependability and safety with **ANNICO TEFSEAL SEATS** proven in dangerous services, such as Liquid Oxygen, Fuming Nitric Acid, Liquid Nitrogen and CO<sub>2</sub>, Fuels and other FLUIDS at all pressures and temperatures -300° to +450° F

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### Control VALVES

When inquiring check 7434 opposite last page



## ✓ Are you saving all you can with Liquid Meters?

Here's a check-list of savings made every day with accurate metered measurement of more than 150 industrial liquids. Chances are you can use at least five of these ideas in your plant:



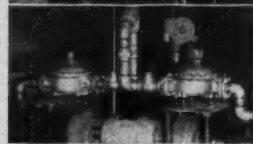
✓ **AUTOMATIC BATCH MIXING:** Meter liquids directly to tanks or kettles with Neptune Auto-Stops. Push buttons to set quantity . . . meter cuts off accurately, automatically. No waiting for weigh tanks to fill, no "inching" up to gauge marks, no wrestling with bags or buckets.



✓ **AUTOMATIC PROCESS CYCLING:** Auto-Stop meters can be equipped with electrical switches to start or stop pumps, agitators, etc. . . . automatically. Saves times, labor, power . . . with closer control.



✓ **ELIMINATE REJECTED BATCHES:** In one leading pharmaceutical plant, Neptune meters eliminated human errors, saved enough costly ingredients to pay for the meters in less than a month! How's your "reject" rate?



✓ **EASIER INVENTORY, COST CONTROL:** Neptune Meters at key check points keep track of inventory, interdepartmental use, production rates, etc. They put a stop to waste, verify full measure received or delivered.



✓ **AUTOMATIC DRUM FILLING:** This Neptune fills drums, radiators, fuel tanks, etc., with exact quantity every time you press the handle. Saves time, labor, prevents spills or "shorts."



✓ **OIL BURNERS, DIESELS:** Use these low-flow meters instead of bulky day tanks to measure fuel consumed by boilers, melting furnaces, diesels, etc.



✓ **WATER CONDITIONERS:** Trident meter's wary eye tells when ion exchange unit needs recycling. See if yours has trouble-free Trident.



✓ **TANK TRUCK DELIVERIES:** Many industrial liquids can be delivered by metered trucks with greater ease and accuracy than markers, gauges or sticks. Investigate Red Seal meters.

Give you any ideas?

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## INSTRUMENTATION & CONTROL

(Continued from preceding page)

0-5mm Hg. Measuring element and housing available in stainless. (27)

### Transmitter, density

Measures density of clean fluids, produces proportional change in resistance which can be measured by electronic potentiometer. (116)

### Transmitter, displacement

Differential transformer to measure rotational motion from 0.000001 to 0.125". Unit has mounting flange, standard "AN" connector. Sensitivity is 5 mv/0.001" with 6.3v AC, 60 cps. Output impedance: 200 ohms; linearity: 1/2 %. (Model 100 Universal displacement transmitter — 46)

### Transmitter, differential pressures

Differential pressure transmitter. Range continuously adjustable from 0-50" to 0-250" WC. Free from ambient temperature and pressure overrange effects. (M/13A d/p Transmitter — 67)

### Transmitter, differential pressure

Pneumatically transmits over 3-15 or 3-27 psig ranges, differential pressures from 0-20 to 0-200" WC under service pressure of 800 psig; and 0-200 to 0-1200" WC under service pressures of 3500 or 600 psig. Mercury U-tube measuring mechanism. (Type BU 13-11)

### Transmitter, electronic pneumatic

Pneumatic transmitter 3-15 psi output, using electronic measuring system for pH, speed, resistance, electrical values, etc. (27)

### Transmitter, flow

Pneumatic force balance transmitter continuously adjustable from 0-20 to 0-200" WC. Output of 3-15 psig. (65)

### Transmitter, flow

Variable-area meter transmits electric signals corresponding to flow. Minimum range: 0-550 lb/hr; maximum range: 0-108,000 lb/hr; maximum service pressures: 250 or 600 ASA Standards. (Type JR11 — 11)

### Transmitter, flow

Static pressure rating is 1500 psi. Range adjustable from 0-15" to 0-300" WC. Force balancing mechanism uses vector principle. Output pressure is 3-15 psi. (122)

### Transmitter, flow

Electrically transmits rate of flow using Ledoux bell measuring mechanism. For standard differentials across primary elements from 0-13.25 to 0-212" WC at maximum service pressures to 800, 3500, and 6000 psig. (CC12 — 11)

### Transmitter, flow

Magnetic flow meter for liquids. No obstruction in piping. Creates no pressure drop. Linear flow scale. (67)

### Transmitter, flow

Produces AC signal proportional to rate of flow through unit. Can be supplied with either standard (up to 300 cps) output or high-frequency (2000 cps) output according to type of instrument used. (116)

### Transmitter, flow

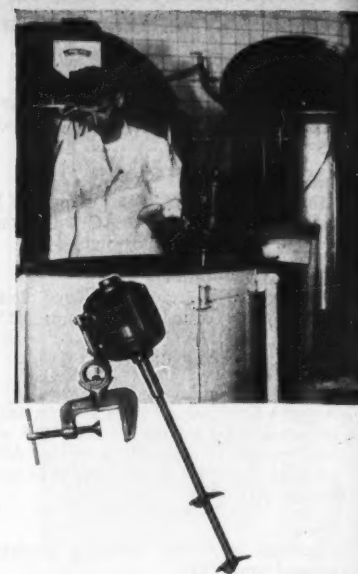
Integrating flowmeter opens (or closes) switch with every gallon or tenth of a gallon. Max speed is 1500 pulses per minute. (Electrical impulse contactor — 124)

### Transmitter, flow

Mercury U-Tube measuring mechanism. Extracts square root of flow differentials to produce pneumatic signals of 3-15 or 3-27 psig directly proportional to flow. (Type CU16 — 11)

### Transmitter, level

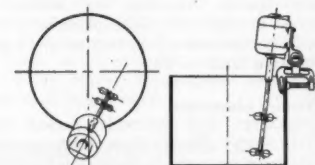
Immersed float balance transmitter gives a vacuum



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When inquiring check 7436 opposite last page

CHEMICAL PROCESSING

When inquiring check 7435 opposite last page



signal proportional to main line water flow. (65)

#### Transmitter, mass flow

Sensing element measures rate of flow and another density. Both feed signals to same instrument. Volumetric reading is automatically corrected to gravimetric units in read-out instrument. (116)

#### Transmitter, pneumatic

Force-balance instrument measures temperature, or gage or absolute pressure, in any span within its overall limits, **without adding or changing parts**. Output is 3 to 15 psi. (Tel-O-Set transmitter — 104)

#### Transmitter, pneumatic

Produces 3-15 psi with fast response. Incorporates "noise" filter, overpressure protection to 1500 psi. Ranges: 0 to 50 and 0 to 250" WC. (13A d/p — 67)

#### Transmitter, temperature

Force balance. Compensated for ambient temperature. Transmits 3-15 psi signal. Range selections from -100°F to +1000°F. (12A Transmitter — 67)

#### Transmitter, vacuum

Immersed float vacuum transmitter for chlorination service. Corrosion resistant construction. (65)

#### Tube, Geiger

Detects radioactivity for spectrographic X-ray use. Operating temperature range is minus 55°C to 75°C. Resolving time of approximately 150  $\mu$  sec. (No. 62030 Geiger counter tube — 111)

#### Tubing, instrument

Polyethylene tubing for pressure/temperature lines under normal operating conditions. Tubes are  $\frac{1}{4}$  and  $\frac{3}{8}$ " OD with wall thickness of 0.040 and 0.062". Comes in 500 ft lengths. (Dekoron "P" Ribbon — 107)

(Please turn to next page)



"Then after you adjust the interlocking control tower chart and it still don't work ... give it a SWIFT KICK!"

Our thanks to Lester H. May, Jr., Union Oil Company of California, Rodeo, Calif.

## "Every Angle" Design Maxivision® Accuracy Bi-Metal Actuation

### Now...all 3 in one 'American' Thermometer

Only this new American Thermometer\* gives you the three features most demanded in a dial thermometer. The "Every Angle" design allows you to install this thermometer *anywhere*... then angle it in the direction that provides easiest reading. The anti-parallax Maxivision dial guarantees the surest, sharpest, easiest reading. Graduations are carried on a raised ring, set close to the cover glass, with an index-type, functional pointer set at the same level. The result — no perspective effect — parallax error practically eliminated. Finally, bi-metal actuation insures high sensitivity, economy, and surety of operation.

Install the new American "Every Angle" Bi-Metal Dial Thermometer anywhere — inside or out. Its climate-proof case defies any weather condition. The full use of these thermometers in any process plant makes possible temperature readings with the same ease and facility of those of a pressure gauge. Write today for complete information. Ask for Bulletin 148.

\*Pat. App. For

#### SPECIFICATIONS

##### 5-Inch Type 5-6060 American "Every Angle" Bi-Metal Dial Thermometer

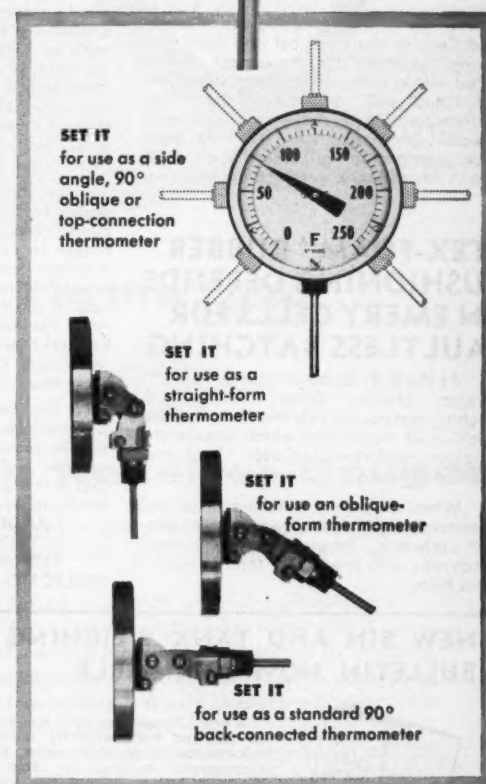
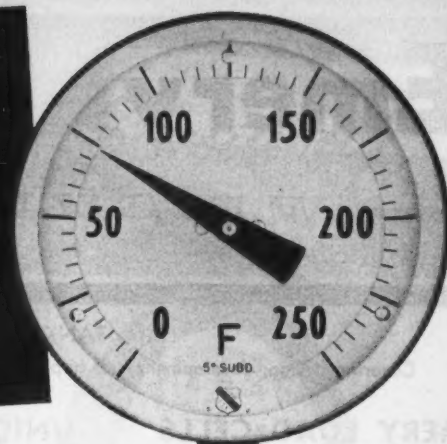
Temperature Ranges: From minus 80° to plus 1000° F. Accuracy within 1% of range. Dial Size: 5". Scale approximately 10½" long. Bi-Metal Coil: Low mass, with single helix close to inside wall of stem assures high sensitivity. Silicone fluid dampens vibration, accelerates transfer, speeds response. Case: Stainless steel. Bezel: Threaded to case. Front: Clear, extra-heavy glass set in channeled gasket to seal case. Pointer: Functional type, adjustable from front. Stem: Lengths — 4" to 24", 18-8 stainless steel. All joints welded. Connection: Fixed, ½" NPT. Separable Sockets: Available in all materials and sizes normally required.



## AMERICAN INDUSTRIAL INSTRUMENTS

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Oklahoma. AIRCRAFT CONTROL PRODUCTS, Danbury & Stratford, Conn. and Inglewood, Calif. "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.



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When inquiring check 7437 opposite last page

# Emery

## WEIGHING SYSTEM

# NEWS

BIN, TANK AND HOPPER EDITION

No. 1

Covering design, development and application data on Emery Weighing Systems for industrial applications

### EMERY LOAD CELLS NOW CORROSION RESISTANT AND WEATHER-PROOFED

In view of the increasing use of Emery Load Cells in the chemical and food processing industries, this equipment is now coated with a corrosion resistant compound and fitted with a plastic "boot" for weather-proofing. Formerly available as a "special" this treatment has now been made standard for all Emery Load Cells used in bin and tank weighing applications.

### "TEX-FOAM" RUBBER CUSHIONING DEPENDS ON EMERY CELLS FOR FAULTLESS BATCHING

At the B. F. Goodrich Sponge Products Division, Shelton, Conn., Emery tank weighing systems provide the fast, pin-point weigh-in of ingredients which insures the luxurious comfort of Goodrich "Texfoam" rubber cushioning.

Wherever precise batching of several ingredients is absolutely necessary to product perfection, Emery Weighing Systems match wits with production formulas without a hitch.

### UNIQUE "ROLLING BALL" CONSTRUCTION SOLVES OFF-CENTER LOADING PROBLEMS IN TANK WEIGHING

Every engineer knows that there is constant linear expansion, contraction and crosswise movement in all metal structures such as tanks, bins and hoppers. In the accurate weighing of the contents of these structures, it is imperative that the weighing device be designed to compensate for this off-center loading. Any weighing device which does not allow for this movement is not properly designed.

In the Emery Load Cell, a unique design feature known as the "rolling ball" construction permits the tank, bin or hopper to expand and contract or to shift sideways and, yet, the load is always accurately transmitted through the rolling ball to the cell. (See Fig. 1) As the ball rolls, the center of loading rolls on the hardened steel inserts and, the structure of the Emery Cell is designed to withstand these loads.

The Emery Load Cell is, in effect, a transducer which changes load to hydraulic pressure which, in turn, is used to actuate indicators, recorders, controllers and printing devices. The system is practically maintenance-free. (See Fig. 2)

RANGES: 0 to 10,000,000 pounds  
... ACCURACY: 1/10 of 1 % of range  
... RESPONSE: less than 1/2 second ...  
DEFLECTION: less than 0.005"

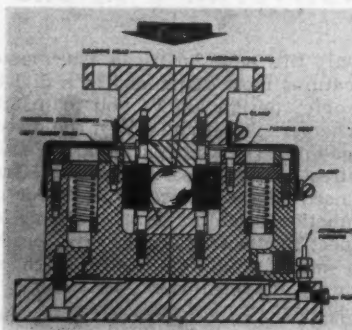


FIGURE 1

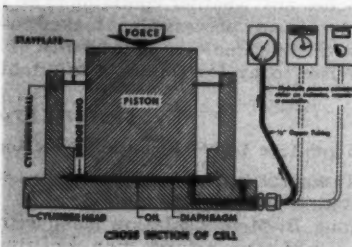


FIGURE 2

### NEW BIN AND TANK WEIGHING BULLETIN NOW AVAILABLE



A new 12-page, two color bulletin on bin and tank weighing which incorporates a practical series of arrangement drawings of Emery Weighing Systems in use, has just become available for distribution.

One of the most important bulletins to be issued on bin and tank weighing thus far, this becomes a veritable handbook on weighing systems. Every process engineer and every materials handling man should have a copy in his file. Your copy is ready for mailing. Send for it today.

### TANK PIVOTS AND STAY STRUTS REDESIGNED TO MATCH NEW EMERY LOAD CELL

The tank pivots and stay struts used in tank and bin weighing applications in conjunction with Emery Load Cells have been redesigned to match the Load Cell dimensions.

Similarly, the same corrosion resistant treatment given the Load Cells is now applied to the

tank pivots and stay struts. A plastic "boot" is also supplied with this equipment to repel moisture and dirt.

It is this attention to detail in Emery Weighing Systems which insures the accuracy for which Emery has become known the world over.

### INSTRUMENTATION & CONTROL

(Continued from preceding page)

#### TV System, closed-circuit

Monitor combines a 10-inch kinescope, power supply, and all monitor and camera controls in small dust-tight metal case. Camera can be located up to 500 feet from monitor-control unit. (TV System — 121)

#### Valve, control

Pneumatic or hydraulic operator for 3-15 psi with max rating of 50 psi. Valve sizes from 1/4 to 4", designed for linear movement. (No. 992-D valves — 123)

#### Valve, control

Pneumatic actuator can be inverted to change valve action while in use. Normal sizes from 1/2 through 8". (79)

#### Valve, control

Control valve for pulp stock and slurry service with interchangeable restricted port openings. (65)

#### Valve, control

Air valve, four-way, for air range to 250 psi. Available in 1/4 and 3/8 inch port sizes. (16)

#### Valve, control

Electro-hydraulic valve accepts electric signal and electric power to drive self-contained pump. Signal is 0.5 to 5 ma DC. (Electro-hydraulic valve — 100)

#### Valve, pilot

For direction, interlock, transfer and other services in pneumatic systems to 250 psi, 200°F. Sectionalized construction of 1/4" valves permit 2-, 3-, and 4-way valves to be assembled from interchangeable parts. (D Pilotair Valve — 143)

#### Valve, pilot

Responds to changes of 0.1% in differential loading pressure. Unit operates by converting differential between flow transmitter and rate setter, amplifying pressure differential with pneumatic-operated power booster. (BalanCel Pilot Valve — 23)

#### Valve, hydraulic

Operating pressures to 1500 psi; heavy-duty continuous-service solenoids; pilot-operated; subplate mounting or tapped parts; 2-position, 4-way or 3-position, 4-way types. Sizes from 1/4" to 1". (98)

#### Valve, manifold

Differential pressure instrument manifold valve is equivalent of four valve manifold with two line shut-off valves and two equalizing valves with vent plug between them. (Valve — 122)

#### Valve, needle

Type 416 stainless steel needle valve for corrosive service and pressures to 10,000 psi. (Type 416 — 102)

#### Valve, sampling

Designed to have the valve seat inside wall of a vessel to prevent liquid remaining in nipple and valve. Male 3/4" NPT connection. (90)

#### Valve, solenoid

Full ported, 316 stainless, high pressure solenoid valve for 3000 psi maximum pressure, any voltage. Piston-pilot operated. (8)

#### Valve, solenoid

4-way, for air, water and light oil to 150 psi, designed to JIC spec. AC or DC by coil change. (16)

#### Voltmeter, DC

For DC null measurements over range of 0-600v DC, with accuracy of  $\pm 10$  microvolts. (121)

#### Weigh feeder

For accurate gravimetric feeding, batching and proportioning — constant weight. (88)



THE A. H. EMERY COMPANY  
Pine Street • New Canaan, Conn.

When inquiring check 7438 opposite last page



## Instrument Manufacturers

This alphabetical list of instrument manufacturers is arranged by key number corresponding to the instrument code used in the listing of new instrument developments which starts on page 66 of this issue.

1. Aero Research Instrument Co., Inc.  
315 North Aberdeen Street  
Chicago 7, Illinois
2. American Optical Company  
Buffalo 15, New York
3. American Radiator & Standard Sanitary Co.  
American Blower Division  
811 Tireman Avenue  
Detroit 32, Michigan
4. Applied Physics Corporation  
362 W. Colorado  
Pasadena, California
5. Askania Regulator Company  
240 East Ontario Street  
Chicago 11, Illinois
6. Assembly Products, Inc.  
P. O. Box 308  
Desert Hot Springs, California
7. Associated Research, Inc.  
3758 W. Belmont Avenue  
Chicago 18, Illinois
8. Atkomatic Valve Co., Inc.  
345 West Abbott Street  
Indianapolis, Indiana
9. Automation Instrument Corporation  
1516 Summer Street  
Philadelphia 2, Penna.
10. Bacharach Industrial Instruments Company  
7301 Penn Avenue  
Pittsburgh 3, Penna.
11. Bailey Meter Company  
1070 Ivanhoe Road  
Cleveland 10, Ohio
12. Baird Associates, Inc.  
33 University Road  
Cambridge 38, Mass.
13. Baldwin-Lima-Hamilton  
940 Simpson Street  
Eddystone 42, Penna.
14. Baldwin Piano Company  
1858 Gilbert Avenue  
Cincinnati 2, Ohio
15. Barber Colman Company  
Wheelco Instrument Division  
1300 Rock Street  
Rockford, Illinois
16. Barksdale Valves  
5125 Alcoa Avenue  
Los Angeles 38, Calif.
17. Barnes Engineering  
30 Commerce Road  
Stamford, Conn.
18. Bausch & Lomb Optical Company  
635 St. Paul Street  
Rochester 2, N. Y.
19. Arnold O. Beckman, Inc.  
1020 Mission Street  
South Pasadena, Calif.
20. Beckman Division  
Beckman Instruments, Inc.  
Fullerton, Calif.
21. Berkeley Division  
Beckman Instruments, Inc.  
Richmond 3, Calif.
22. Bellofram Corp.  
Gouvernaire Div.  
Burlington, Mass.
23. B-I-F Industries Inc.  
345 Harris Avenue  
Providence 1, R. I.
24. Black, Sivals & Bryson, Inc.  
7500 E. 12th Street  
Kansas City 26, Missouri
25. Bogue Electric Manufacturing Co.  
52 Iowa Ave.  
Paterson 3, New Jersey
26. Branson Ultrasonic Co.  
Div. of Branson Instruments, Inc.  
194 Richmond Hill Ave.  
Stamford, Conn.
27. The Bristol Company  
Waterbury 20, Conn.
28. Brooklyn Thermometer Co.  
217-09 Merrick Blvd.  
Springfield Gardens 13, New York
29. Brooks Rotameter Co.  
Lansdale, Penna.
30. Brush Electronics Company  
3405 Perkins Avenue  
Cleveland 14, Ohio
31. Buffalo Meter Company  
2917 Main Street  
Builders-Providence Inc.  
(see B-I-F Industries)
32. Burling Instrument Co.  
16 River Road  
Chatham, New Jersey
33. Carter Controls, Inc.  
2974 Bernice Road  
Lansing, Illinois
34. A. W. Cash Company  
666 East Wabash Avenue  
Decatur, Illinois
35. Central Scientific Company  
1700 Irving Park Road  
Chicago 13, Illinois
36. Century Electronics & Instruments, Inc.  
1333 N. Utica Street  
Tulsa, Oklahoma
37. Compact Air Samples  
Demarest, New Jersey
38. Conax Corporation  
7811 Sheridan Drive  
Buffalo 21, New York
39. Conoflow Corporation  
Sub. of Walworth Co.  
2100 Arch Street  
Philadelphia 3, Penna.
40. Consolidated Electrodynamics Corp.  
300 North Sierra Madre Villa  
Pasadena, California
41. Consolidated Resistance Corp.  
44 Prospect Street  
Yonkers, New York
42. Cramer Control Corporation  
Centerbrook, Conn.
43. Danco Instruments, Inc.  
195 West Hills Road  
Huntington Station, N. Y.
44. Franklin Dales Company  
180 E. Mills Street  
Akron, Ohio
45. Davis Emergency Equipment Co.  
37 Halleck Street  
Newark 4, New Jersey
46. Daytronic Corporation  
216 S. Main Street  
Dayton, Ohio
47. Dickson Company  
7420 Woodlawn Avenue  
Chicago 19, Illinois
48. The Henry G. Dietz Company  
12-16 Astoria Blvd.  
Long Island City 2, New York
49. W. C. Dillon and Co., Inc.  
14620 Keswick Street  
Van Nuys, California
50. Diverset Corporation  
1920 Roscoe Street  
Chicago 13, Illinois
51. Allen B. DuMont Labs., Inc.  
Technical Products Division  
760 Bloomfield Avenue  
Clifton, New Jersey
52. Durant Mfg. Company  
1929 North Buffum Street  
Milwaukee 1, Wisconsin
53. Ebert Electronics Corporation  
212-20T Jamaica Avenue  
Queens Village 28, N. Y.
54. Thomas A. Edison, Inc.  
51 Lakeside Avenue  
West Orange, New Jersey
55. Electrical & Physical Instrument Corporation  
42-19 27th Street  
Long Island 1, New York
56. Electronics Corporation of America  
Photoswitch Division  
77 Broadway  
Cambridge 42, Mass.
57. Electronics Corporation of America  
Combustion Control Div.  
77 Broadway  
Cambridge 42, Mass.
58. Emmett Machine & Manufacturing Corp.  
445 E. Turkeyfoot Lake Road  
Akron 19, Ohio
59. Enniscope  
2230 Lemon Avenue  
Long Beach 1, California
60. The Exact Weight Scale Co.  
944 W. Fifth Ave.  
Columbus, Ohio
61. Excel Electric Service Co.  
2113 S. Western Avenue  
Chicago 8, Illinois

(Please turn to next page)

*Sensitivity*  
unequaled



... in the *new*



## Diaphragm Receiver Gauges

The new USG Receiver Gauges provide a radical departure in design and performance from any other Receiver Gauge on the market.

The key to the design is a stack of nested diaphragms... made of Ni-Span "C", a special high nickel alloy with a minimum thermal shift, even under wide variations in ambient temperature. These capsules are arranged in stacks occupying minimum space yet providing a sturdy element with extended travel for precise pointer response.

Standard USG Receiver Gauges provide a sensitivity of 1/10 of 1%, accuracy of  $\pm 1/4$  of 1%... both based on full scale readings, and are available in a choice of  $4\frac{1}{2}$ ", 6" or  $8\frac{1}{2}$ " dials.

Write today for details on the USG Receiver Gauge, one of the line of USG creatively engineered, process control instruments. This line includes pressure and temperature pilots, pneumatic transmitters, recorders and controllers.

**USG** **UNITED STATES GAUGE**  
Division of American Machine and Metals, Inc.  
Sellersville, Pa.

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**New!**

## SIMPLEX



### SQUEEZE CONTROLLER

Accurately regulates flow of liquids containing suspended solids or trade wastes—with no effect on moving parts!

A Simplex venturi tube, the most accurate form of primary device, does double duty—measures as it controls.

Special throat section is flexible rubber. If flow tends to change, motor-

driven clamping device adjusts throat area—quickly returns flow to control point.

Throat section is self-scouring. Viscous fluids contact no moving parts.

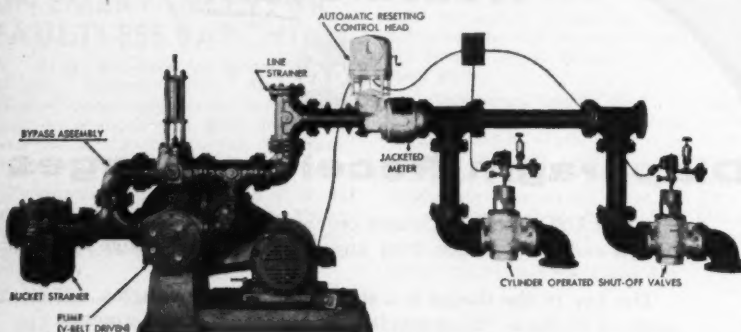
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VALVE AND METER COMPANY

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Multi-valve Fluidometer systems make possible a more flexible production schedule by varying the size of the batches, or by using the automatic resetting control to deliver the same quantity time after time. A multi-valve Fluidometer system may be controlled either at the point of use or at the Fluidometer control head. Fluidometer installations are available either jacketed or un-jacketed and are "tailor made" to fit the particular job. Tell us your batching problem and let us give you our suggestions for solving it. Bulletin FI-56 will be sent on request. For information on jacketed pipe and fittings write for Bulletin J-56.

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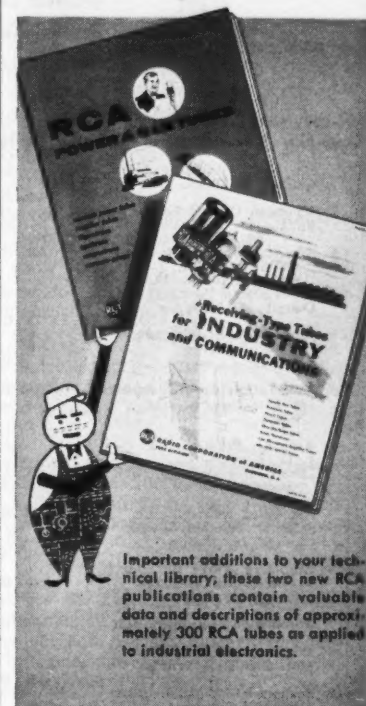
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## INSTRUMENTATION & CONTROL

(Continued from preceding page)

62. Exline Engineering Company  
1636 E. 6th Street  
Tulsa, Oklahoma
63. Farmer Electric Products Co., Inc.  
2300 Washington Street  
Newton Lower Falls, Mass.
64. Fenwall Incorporated  
Mellon Street  
Framingham, Mass.  
Fielden Instrument Division  
(See Robertshaw-Fulton)
65. Fischer & Porter Company  
Hathboro, Penna.
66. Fisher Scientific Company  
717 Forbes Street  
Pittsburgh 19, Penna.
67. The Foxboro Company  
38 Neponset Avenue  
Foxboro, Mass.  
Fulton-Sylphon Division  
(see Robertshaw-Fulton)
68. G. M. Manufacturing Co.  
30 W. 3rd Street  
New York 12, New York
69. Gardner Laboratory, Inc.  
4723 Elm Street  
Bethesda 14, Md.
70. The Gems Company  
64 Welles Drive  
Newington, Conn.
71. General Control Company  
1200 Soldiers Field Road  
Boston 34, Mass.
72. General Electric Company  
One River Road  
Schenectady 5, New York
73. General Radio Company  
275 Massachusetts Avenue  
Cambridge 39, Mass.
74. The Gerber Scientific Instrument Co.  
162 State Street  
Hartford, Conn.
75. Emil Greiner Company  
20-26 N. Moore Street  
New York 13, New York
76. Gulow Controller Company  
301-303 Hackensack Street  
East Rutherford, New Jersey
77. Hagan Corporation  
323 Fourth Avenue  
Pittsburgh 22, Pa.
78. Hallikainen Instruments  
1341 Seventh Street  
Berkeley 10, Calif.
79. Hammel-Dahl Company  
Warwick Industrial Park  
Providence 5, Rhode Island
80. Hastings-Raydist, Inc.  
Super Highway & Pine Ave.  
Hampton 10, Virginia
81. Haydon Mfg. Co., Inc.  
900 Brightwood Ave.  
Torrington, Conn.
82. Hetherington, Inc.  
1200 Elmwood Avenue  
Sharon Hill, Pa.
83. Hills-McCanna Company  
3025 N. Western Ave.  
Chicago 18, Illinois
84. Horwatt, Inc.  
16 Gould Street  
Danvers, Mass.
85. Industrial Instruments  
87 Commerce Road  
Cedar Grove, New Jersey
86. Industrial Nucleonics Corp.  
1205 Chesapeake Avenue  
Columbus, Ohio
87. Instrument Development Labs., Inc.  
163 Highland Avenue  
Needham Heights 94, Mass.
88. The Jeffrey Mfg. Company  
956 N. 4th Street  
Columbus 16, Ohio
89. The Jelrus Company  
136 W. 52nd Street  
New York City, N. Y.
90. Jerguson Gage & Valve Co.  
87 Fellsway  
Somerville 45, Mass.
91. Keithley Instruments  
3868 Carnegie Avenue  
Cleveland 15, Ohio
92. Harold Kruger Instruments  
P.O. Box 164  
San Gabriel, Calif.
93. Lapp Insulator Company  
Process Equipment Division  
7 Gilbert Street  
Le Roy, New Jersey
94. Leeds & Northrup Company  
4901 Stenton Avenue  
Philadelphia 44, Penna.
95. Librascope, Inc.  
808 Western Ave.  
Glendale, Calif.
96. The Liquidometer Corp.  
Sillman Ave., 36th & 37th  
Streets  
Long Island City 1, N. Y.
97. The Locke Machine Company  
971 E. 63rd Street  
Cleveland 3, Ohio
98. Logansport Machine Co., Inc.  
Logansport, Indiana
99. Magnetrol, Inc.  
2110 S. Marshall Street  
Chicago, Illinois
100. Manning, Maxwell & Moore, Inc.  
250 E. Main Street  
Stratford, Conn.
101. Manufacturers Engineering & Equipment Corp.  
Hathboro, Pa.
102. Jas. P. Marsh Corporation  
3501 West Howard Street  
Skokie, Ill.
103. Milli-Switch Corporation  
1742 Berkeley Street  
Santa Monica, Calif.
104. Minneapolis-Honeywell Regulator Co.  
Wayne & Windrim Aves.  
Philadelphia 44, Pa.
105. Minneapolis-Honeywell Regulator Co.  
Industrial Division  
Wayne & Windrim Aves.  
Philadelphia 44, Pa.
106. Moisture Register Company  
1510 W. Chestnut Street  
Alhambra, California
107. Samuel Moore & Co.  
Dekoron Tubing Division  
Mantua, Ohio
108. National Instrument Co.  
2701 Rockwood Avenue  
Baltimore 15, Md.
109. National Instrument Laboratories, Inc.  
6108 Rhode Island Ave.  
Riverdale, Md.
110. Norcross Corporation  
247 Newtonville Ave.  
Newton 58, Mass.
111. North American Philips Co., Inc.  
Research & Control Div.  
750 S. Fulton Ave.  
Mount Vernon, New York
112. Nuclear Instrument & Chemical Corp.  
223 W. Erie Street  
Chicago 10, Illinois

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CHEMICAL PROCESSING

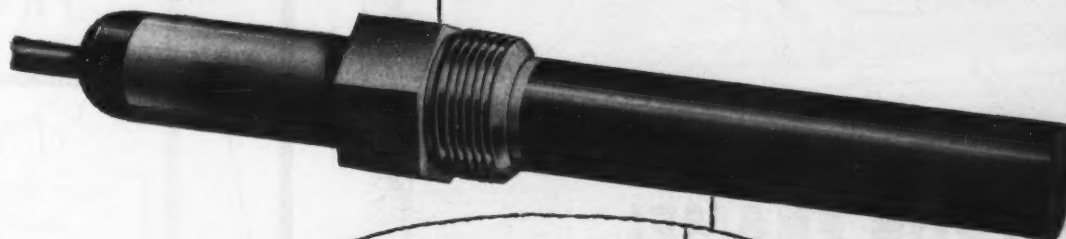
## INSTRUMENTATION & CONTROL

- |  |   |
|--|---|
| 113. Ohaus Scale Corporation<br>1050 Commerce Avenue<br>Union, New Jersey                          | 128. Scully-Jones and Company<br>3758 W. Belmont Ave.<br>Chicago 18, Illinois         |
| 114. The Perkin-Elmer Corp.<br>Norwalk, Conn.  | 129. Servo Corporation of America<br>2020 Jericho Turnpike<br>New Hyde Park, N. J.    |
| 115. Phoenix Precision Instrument Co.<br>3803-5 N. Fifth Street<br>Philadelphia 40, Pa.            | 130. Simplex Valve & Meter Co.<br>7 E. Orange Street<br>Lancaster, Pa.                |
| 116. Potter Aeronautical Co.<br>P.O. Box 532, Route 22<br>Union, New Jersey                        | 131. Arthur F. Smith Co.<br>Rochester 3, N. Y.  |
| 117. Precision Scientific Co.<br>3737 W. Cortland Street<br>Chicago, Illinois                      | 132. Sorensen & Company, Inc.<br>375 Fairfield Avenue<br>Stamford, Conn.              |
| Process Equipment Div.<br>(see Lapp Insulator Co., Inc.)   | 133. Spencer Mfg. Co.<br>3253 N. Cicero Ave.<br>Chicago 41, Ill.                      |
| 118. Production Instrument Co.<br>702-04 W. Jackson Blvd.<br>Chicago 6, Illinois                   | 134. The Standard Electric Time Co.<br>89 Logan Street<br>Springfield 2, Mass.        |
| Proportioners, Inc.<br>(see B-I-F Industries, Inc.)  | 135. Taylor Instrument Companies<br>93 Ames Street<br>Rochester, New York             |
| 119. Quaker Oats Co.<br>Mechanical & Electronic Products Div.<br>205 Water Street<br>Akron 8, Ohio | 136. Thermo Electric Co., Inc.<br>Fair Lawn, New Jersey                               |
| 120. Radiation Counter Labs., Inc.<br>5121 W. Grove Street<br>Skokie, Ill.                         | 137. Toledo Scale Co.<br>Telegraph Road<br>Toledo 1, Ohio                             |
| 121. Radio Corporation of America<br>RCA Building<br>30 Rockefeller Plaza<br>New York 20, N. Y.    | 138. Tracerlab, Inc.<br>Industrial Division<br>130 High Street<br>Boston 10, Mass.    |
| 122. Republic Flow Meters Co.<br>2240 Diversey Pkwy.<br>Chicago 47, Illinois                       | 139. United Electric Controls<br>Dexter & School Streets<br>Watertown 72, Mass.       |
| 123. Robertshaw Fulton Controls Company<br>2920 N. 4th Street<br>Philadelphia 33, Pa.              | 140. Varian Associates<br>611 Hansen Way<br>Palo Alto, Calif.                         |
| 124. Rockwell Mfg. Co.<br>Valve & Meter Division<br>400 North Lexington Ave.<br>Pittsburgh 8, Pa.  | 141. Wabash Instrument & Specialties Co., Inc.<br>Box 194<br>Wabash, Indiana          |
| 125. Milton Roy Co.<br>1300 E. Mermaid Lane<br>Philadelphia 18, Pa.                                | 142. Weksler Thermometer Corp.<br>195 East Merrick Road<br>Freeport, L. I., New York  |
| 126. Royson Engineering<br>102 N. Penn Street<br>Hartboro, Pa.                                     | 143. Westinghouse Air Brake Industrial Products Division<br>Box 36<br>Wilmerding, Pa. |
| 127. Sarco Company, Inc.<br>Empire State Building<br>New York 1, New York                          | 144. Weston Electrical Instrument Corp.<br>614 Frelinghuysen Ave.<br>Newark 5, N. J.  |
| 145. Zenith Electric Co.<br>152 W. Walton Street<br>Chicago 10, Ill.                               |   |



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To fill every need in temperature, pressure, or corrosion resistance. Polystyrene, lucite, epoxy, nylon, polyethylene, bakelite, hard rubber, teflon, Kel-F, stainless steel, nickel, monel or glass.

## PHYSICAL RANGE

Cells designed for operation under pressures up to 7000 PSI. Only Industrial Instruments can supply the exact cell best suited to your needs. There is no need to settle for a universal compromise type when you can so easily have the cell that will work properly.

## ELECTRODE MATERIALS

Nickel, platinum, graphite, gold or tin. The right electrode to do the job right.

## CONDUCTIVITY RANGE

A complete line of cell constants for all applications from the measurement of ultra-pure water to highly concentrated solutions of acids, alkalis and salts.

**Instruments for Measurement and Control**  
Industrial Instruments offers a complete line of indicating, measuring, recording and control instruments for use with conductivity cells.

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**WORLD LEADER IN ELECTROLYTIC CONDUCTIVITY**



**Industrial Instruments INC.**

Industrial Instruments, Inc., 89 Commerce Road, Cedar Grove, Essex County, N. J.

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Don't wait on  
the weather...

paint now with NEW  
**VALPON ENAMEL**

- NO "BLUSHING"—EVEN AT HIGH HUMIDITY
- FASTER CURING—EVEN AT LOW TEMPERATURES

Perhaps you've tried a cold-cured epoxy and encountered excessive blushing or slow drying because of weather conditions. But this new Valpon Enamel, made with Shell's famous Epon Resins, eliminates these headaches. Now you can paint indoors or out at humidities up to 90° without blushing—get faster curing even at low temperatures.

In addition, Valpon assures a higher dry film thickness for greater protection with fewer coats—a heavier, tougher film build and better adhesion.

Find out more about this new, improved Valpon Enamel. Mail your request on your regular letterhead now to the address below and enclose filled out coupon for **FREE** sample of Live Paint Film.



**VALDURA**  
HEAVY DUTY  
PAINT DIVISION  
AMERICAN-MARIETTA CO.  
101 E. Ontario St., Chicago 11, Ill.



**SAMPLE DECAL  
OF LIVE PAINT FILM**

Film consists of two coatings of Val-Chem Primer and two coatings of Valpon Enamel, resulting in a thickness of 7 mils. Send for your **FREE** sample decal today.

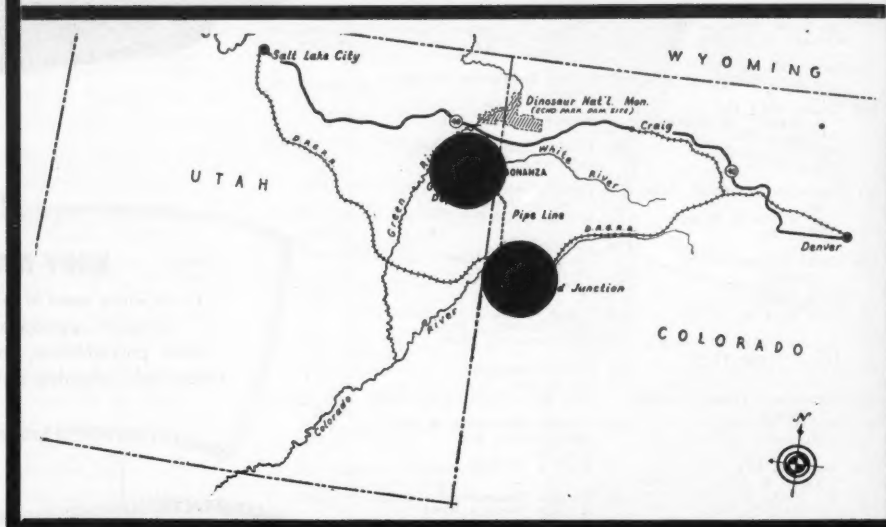
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When inquiring check 7444 opposite last page

**Ideas** — from other industries and nuclear field . . .  
new trends in research, processes, services

Scheduled to go "on stream" in spring 1957, \$16-million  
privately financed Utah-Colorado project will produce . . .

## COKE AND GASOLINE FROM GILSONITE



Map shows locations of \$16-million project. Slurry will be pumped through 70-mile pipeline from Bonanza, Utah, to Gilsonite, Colorado

**Initial daily output will be 250 tons calcined coke,  
1300 bbl high-octane gasoline, 300 bbl fuel oil**

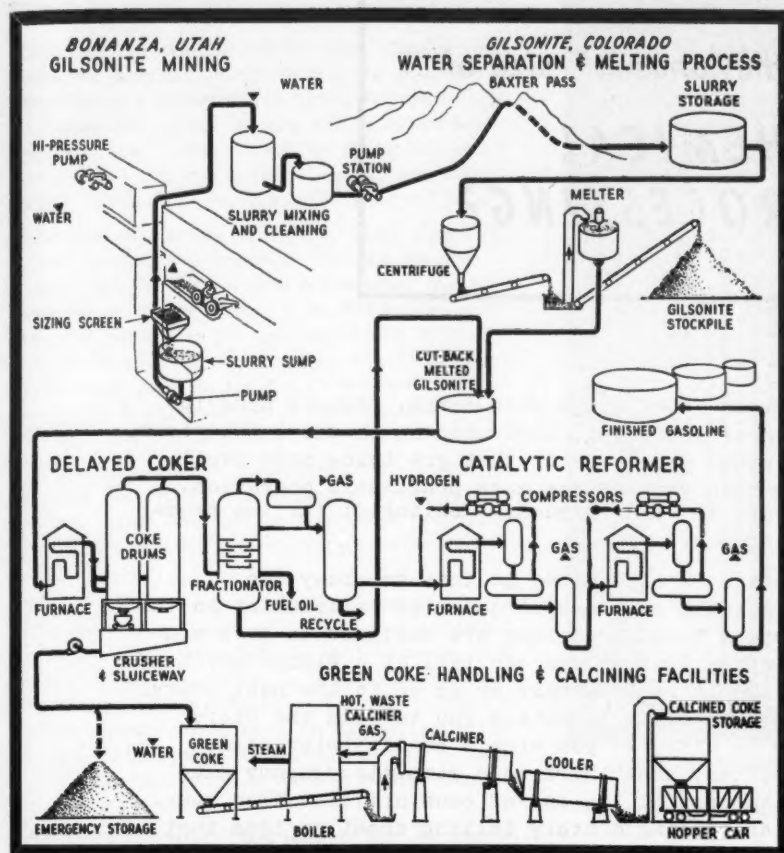
The first privately financed plant in the US to produce conventional petroleum products from a solid non-petroleum source is scheduled for completion by spring 1957. Now under construction on a 1200-acre site at Gilsonite, Colorado, a newly named location near Grand Junction, the plant will convert Gilsonite (scientific name, Uinitaite) mined in eastern Utah into high-grade coke. High-octane (86 unleaded) gasoline will be a by-product. Total cost for the project is about \$16 million. Initial plans were first announced last year (see **CHEMICAL PROCESSING**, September 1955, pages 104-105).

Complete coking operation will be performed at the site. Plant will both produce and calcine the coke. Product will be of high

purity, for use in metallurgical refining and in specialty carbon fields. Initial marketing will be directed to the aluminum industry.

Gasoline will be blended and finished for marketing in western Colorado, now served by distant refineries.

Using a delayed coker, a fractionator, and a catalytic reformer, the plant will convert the hydrocarbon mineral into 50 percent (by weight) green coke, 35 percent gasoline, and 15 percent 1400-Btu gas. The gas will be used for plant fuel. Initial daily output (based on throughput of 630 tons Gilsonite per day) will be 250 tons calcined coke, 1300 bbl gasoline, and 300 bbl fuel oil. Plant is designed to eventually produce up to 550 tons calcined coke per day. Known



Flow diagram of Gilsonite processing operations

reserves of Gilsonite in this area only should last for at least 50 years under contemplated processing plans.

Mining operations will be conducted at company-owned deposits at Bonanza, Utah. Wet mining techniques developed by the company over the past four years will be used. Both hydraulic-jet and carbide-tipped rotary drill cutters will be used. Ore is kept wet throughout cutting operation and is pumped

to surface in slurry form. Wet mining eliminates possibility of dust explosion and reduces need for hand labor.

The slurry (20-60% Gilsonite, 80-40% water) will be pumped through a \$2-million six-inch pipeline to the processing plant 70 miles away, through extremely rugged, uninhabited mountain terrain. Line will be operated from pump station at Bonanza.

(Please turn to page 101)

#### Analysis of Calcined Coke to be Produced at Gilsonite, Colo.

Physical		Chemical — in %	
Moisture, %	0.5 max	Sulfur	0.25 max
Volatile Combustible Material, %	0.5 max	Silicon	0.04 max
Ash, %	0.5 max	Calcium	0.05 max
Soluble Salts, %	0.5 max	Iron	0.03 max
Density	2.0	Titanium	0.005 max
Size, inches	2 max	Nickel	0.04 max
		Vanadium	0.0004



**"K"**  
Cast-Iron Fittings  
save  
a lot of money

#### COST COMPARISON

This is a comparison of the cost of using the recommended fittings with the cost of using steel welded fittings. The costs quoted have been derived from a number of contractors and include labor, installation and threading or welding.



**KUHN BROTHERS COMPANY**  
MANUFACTURERS OF "K" FITTINGS  
DAYTON, OHIO

90° Cast-Iron Elbow vs. 90° Steel Elbow		Cast-Iron Tee vs. Steel Tee		Cast-Iron Reducing Tee vs. Steel Reducing Tee		Cast-Iron Eccentric Reducer vs. Steel Weld Reducer	
Size	Cast-Iron	Size	Cast-Iron	Size	Cast-Iron	Size	Cast-Iron
1/2"	\$ 3.38	1/2"	\$ 4.14	1/2"	\$ 4.14	1/2"	\$ 4.14
3/4"	5.08	3/4"	7.48	3/4"	7.48	3/4"	7.48
1"	6.72	1"	9.57	1"	9.57	1"	9.57
1 1/4"	11.48	1 1/4"	17.74	1 1/4"	17.74	1 1/4"	17.74
2"	14.31	2"	22.37	2"	22.37	2"	22.37
2 1/2"	16.30	2 1/2"	26.79	2 1/2"	26.79	2 1/2"	26.79
3"	17.55	3"	31.42	3"	31.42	3"	31.42
4"	24.08	4"	41.91	4"	41.91	4"	41.91
6"	34.65	6"	61.86	6"	61.86	6"	61.86
8"	44.65	8"	81.86	8"	81.86	8"	81.86
10"	54.65	10"	101.86	10"	101.86	10"	101.86
12"	64.65	12"	121.86	12"	121.86	12"	121.86

This comparison clearly indicates that all low pressure lines should be installed with 125 lb. Screwed Cast-Iron Fittings.

Above is a quarter-size reproduction of a blotter showing the comparative costs of cast-iron screwed fittings and steel welded fittings. On the blotter you can readily read the figures—and they will amaze you.

For instance, the installed cost of a 6" cast-iron tee is less than 1/3rd that of a 6" steel welded tee. The cost comparisons cover nine sizes each of 90° elbows, tees, and reducing tees; six sizes of eccentric reducers.

The blotter will show you the large amount of money you can save by using "K" Cast-Iron Fittings. Ask for it now while the subject's on your mind.

## THE KUHN BROTHERS CO.

DAYTON 1, OHIO

Send me the blotter showing the cost comparison between cast-iron screwed fittings and steel welded fittings.

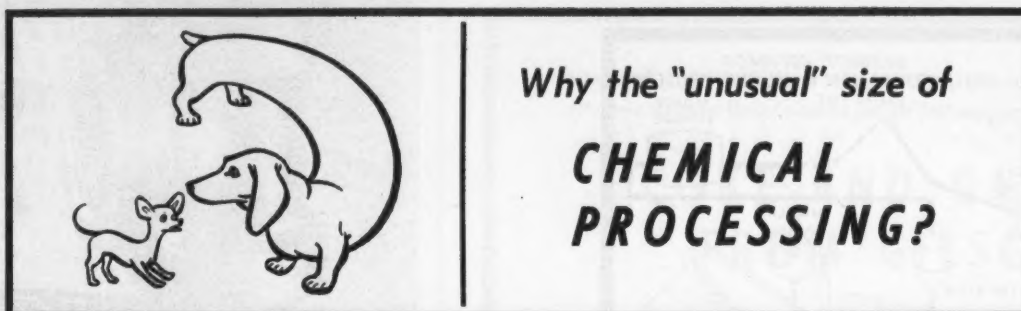
INDIVIDUAL

COMPANY

ADDRESS

When inquiring check 7445 opposite last page





## Why the "unusual" size of **CHEMICAL PROCESSING?**

### *Dear Readers:*

It's a fact that the human eyes see things more "naturally" in the horizontal plane than in the vertical plane. "Wide-screen" movies take advantage of this, and create the "you-are-there" feeling by the horizontally extended picture. The effect is one of naturalness . . . you see things as they would look on the landscape.

CHEMICAL PROCESSING can't use a "screen" as big as that of a movie house to tell the stories within it each month, but we do take advantage of our square, wider-than-average size to display big "cinemascope" photo layouts. You see things more nearly as you would in everyday life . . . and it makes for higher visibility. You see more.

We can do this because CP's page size is big . . . almost as big as the Saturday Evening Post, Life, or Fortune. Not quite as high, but wider. That makes CP "different" from other industrial magazines in the chemical processing industries.

But CP is "different" in other ways, too . . .

As you leaf through the issue, you'll see that editorial articles run clear through the magazine. There are no solid advertising sections. The square format makes this possible, too.

Did you notice that CP is sectionalized (see page 4, where the "highlights" of these various sections are listed)? You can quickly find the sections that interest you most, read them first . . . then page through the other sections later. As far as possible--depending upon makeup restrictions--advertising is sectionalized with the editorial material.

And the type of stories is "different" . . .

You won't find long drawn-out articles dealing with basics like those taught in school. Instead, you'll find helpful reports of ways plant men such as yourself are solving their day-to-day processing

problems . . . along with terse, factual descriptions of equipment, instruments, chemical materials, and other developments that are being made available help you achieve more profitable operation. We call it "post-graduate" editorial for the processing man.

Verbiage is eliminated so that you busy men can get the most decision-making information in the shortest time. Headlines are designed to give you the story gist so you can tell at a glance whether you should read further or go on to the next story. No tricky heads to entice you to read the story only to discover you aren't really interested. Note, too, that there is a complete company name and address at the end of each article. When you finish reading a story telling about an idea that interests you . . . something on which you'd like more specific information for your particular needs . . . you can write to that company. Or you can check the "key" number, appearing at the article's end, on the Reader Service Slip and we will contact the company for you. This is an editorial service to simplify and speed your task of keeping up with the latest developments.

Yes, CHEMICAL PROCESSING is "different" . . .

. . . and you can see there are good reasons why. We think that these "differences" add up to more fruitful reading in less time. CP is designed to keep you informed of the latest developments in our vast, fast-stepping field . . . without taking an undue amount of time from your already crammed day.

At all times we welcome your comments and suggestions. Only as we know more of your needs and wishes can we serve you better.

*The Editors  
of Chemical Processing*

## Gilsonite Processing

(Continued from page 99)

Discharge rate will be 200-500 gpm. Pipeline will cross two canyons; one 600 ft long, the other 700 ft long. Pressure in line will be 2200 psi. Except where it crosses the canyons, the line will be buried below the frost line. Corrosion will be almost eliminated by removing free oxygen from the slurry with sodium sulfite. Gilsonite is not abrasive so wear will be nil.

The Bonanza station will have three electrically driven pumps, two operating and one standby. If power fails, the diesel-engine-driven pump that supplies the jet mining water will be used to push water into the pipeline so that line won't plug at its low points. In addition, there will be a water reservoir at the high point in the line; water from this can be used to flush out the line in both directions should the flow stop for any unforeseen reason.

When slurry reaches processing plant, it will go through de-watering and melting processes to produce a liquid feed for the subsequent operations. Melted ore at 450°F will be charged to the delayed coker.

Overhead from coker will be fractionated, and the gasoline fraction processed in a two-stage catalytic reformer. Heat from bottoms of fractionator will melt incoming ore before it is sent to coker. Reformer operation will be unusual in that it will not produce enough hydrogen to fill its own needs. Hydrogen will be produced from process gas, to make up the deficiency caused by the high olefin content of the coker naphtha.

(Gilsonite processing plant is being built by American Gilsonite Company, Dept. CP, 134 West Broadway, Salt Lake City, Utah.)



"We find training for light-sensitive-chemical production a real problem."

Cartoon by James V. Redding, The Central Pharmacal Co., Seymour, Indiana.

# HOW *HERCULES* HELPS...



**BEAUTY AND PERMANENCE** are combined in New York City's new Coliseum, headquarters for conventions and trade shows. Air-entrained concrete was used on this project. As an air-entraining agent, Hercules Vinsol® Resin improves the basic properties of concrete blocks, precast forms and prepared masonry cements, as well as those of poured concrete structures.



**PRODUCE BETTER FINISHES**

**SAFETY COMES FIRST** with the Cleveland, Ohio, Transit System. That's why the System's 50 new 43-passenger buses have a driver's area finished in multicolor lacquer based on Hercules® nitrocellulose. The easy-to-clean multicolor finish minimizes glare and prevents reflection from sun and headlights. (Described in U. S. Patent No. 2,591,904, held by Coloramic Coatings, Inc., Los Angeles.)



**KEEP PACE WITH RUBBER**

**EXPANDING CONSUMPTION**—The use of natural and synthetic rubber has more than doubled in ten years. To anticipate future demands, Hercules has constructed this pilot plant at Hattiesburg, Mississippi, where new rubber chemicals are being readied for commercial production.

## HERCULES POWDER COMPANY

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SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS, ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS, INDUSTRIAL EXPLOSIVES, AND OTHER CHEMICAL MATERIALS



096-6

# HERCULES

CHEMICAL MATERIALS FOR INDUSTRY

When inquiring check 7446 opposite last page



# FOAMGLAS®

the cellular, stay-dry insulation

**STAYS DRY**—Cut a piece from your sample. Place it in water. Note how the hermetically-sealed glass cells filled with dead air keep it afloat. Weight it down for days, weeks or longer if you like. Remove the weight and it bobs back to the surface . . . proof that the sealed cells have absorbed no water, still have their original insulating efficiency.

## Send for a sample and make these simple tests!

Prove to yourself that FOAMGLAS is your ideal insulation!

Let us send you a free sample of FOAMGLAS. Use it to make the few simple tests illustrated. You'll prove that this unique cellular glass insulation has exactly the right combination of properties to assure you of these vital benefits: constant insulating efficiency . . . long, maintenance-free life . . . strength and rigidity for a variety of structural appli-

cations . . . and ease of handling and installation.

Thousands of users have proved in actual performance the benefits so clearly demonstrated by these tests. No wonder, then, that new users every day are picking FOAMGLAS to insulate the roofs, ceilings, walls and floors of all types of buildings, low temperature

spaces, piping and equipment. Send for a sample today and make your own tests. Please write . . .

### Pittsburgh Corning Corporation

Dept. CP-96, One Gateway Center  
Pittsburgh 22, Pa.

In Canada: 57 Bloor St. W., Toronto, Ontario



**VAPOR-PROOF**—With a nail file, cut a 1/4" thick slice from your sample. Hold it to your lips and try to blow smoke through it. The smoke won't penetrate . . . proof that FOAMGLAS is a positive vapor barrier in itself.



**STRONG AND RIGID**—Place your FOAMGLAS block on the floor. Stand on it. Note how it supports your weight without crushing. Compressive strength is over seven tons per square foot . . . making it ideal for load bearing applications.



**INORGANIC AND FIREPROOF**—Hold a flame to your sample. You'll see at once that it does not burn . . . a major safety feature in all construction. It's even acid-proof and rodent-proof as you can prove if you happen to have a vial of acid or a pet rat handy.



**LIGHT WEIGHT**—Just pick up your sample to see how light and easy to handle it is. Check actual weight on your company's postal scale if you wish. The density of FOAMGLAS is only 9 pounds per cubic foot.



**EASY TO SHAPE AND CUT**—Shave some strips off your sample with an ordinary paper clip . . . workmen use knives, saws or trowels for quick shaping and fitting on the job.

## IDEAS

### API-ASME vessel code to be discontinued

The code of standards used by the American petroleum industry for over 20 years in building and maintaining pressurized production and storage facilities will be discontinued on December 31, 1956. Known as the API-ASME Code for Unfired Pressure Vessels for Petroleum Liquids and Gases, the code was first approved in 1934. One reason for cancellation is the growth in scope of the ASME Unfired Pressure Vessel Code which has been expanded to cover the petroleum industry's needs more completely.

(Information courtesy American Petroleum Institute, Dept. CP, 50 W. 50th Street, New York 20, New York.)

### Plastic bearings covered in 115-page report

Application of plastics to roller and ball bearings is subject of 115-page report. Included are data on plastics tested, testing procedures used, testing evaluations, bearing design data, and various charts.

To obtain report on plastic bearings remit \$4.75 direct to Kaydon Engineering Corp., Dept. CP, McCracken St., Muskegon, Michigan.

### Book contains thirty papers on applied solar energy

Proceedings of the World Symposium on Applied Solar Energy are published in 300-page book. Thirty papers are included. Subjects covered include solar water heaters, solar collector design, solar energy conversion, and algal cultures.

To obtain proceedings of World Symposium on Applied Solar Energy remit \$5 direct to The Association for Applied Solar Energy, Dept. CP, 204 Heard Bldg., Phoenix, Ariz. Specify 7448 opposite last page.

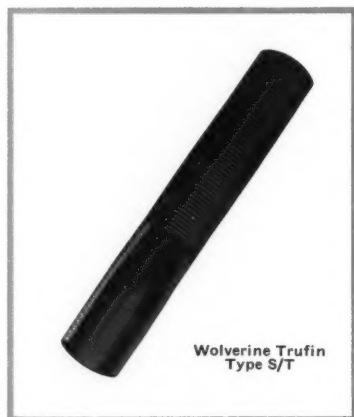
When inquiring check 7447 opposite last page

## Midwest Refinery Boosts Throughput 33%

- Integral finned condenser tube setting new heat transfer records
- Processing engineers take new look at extended surface condenser tube
- Roving reporter describes results of finned tube installations
- Manufacturer offers design information and operating data

by Ernest Dodd

DURING a recent swing through the major petro-refining areas of the Western States this writer was impressed by the amazing production records being established in plants using integral finned condenser tube. The tubing manufacturer is Wolverine Tube and the product is Wolverine Trufin® Type S/T.

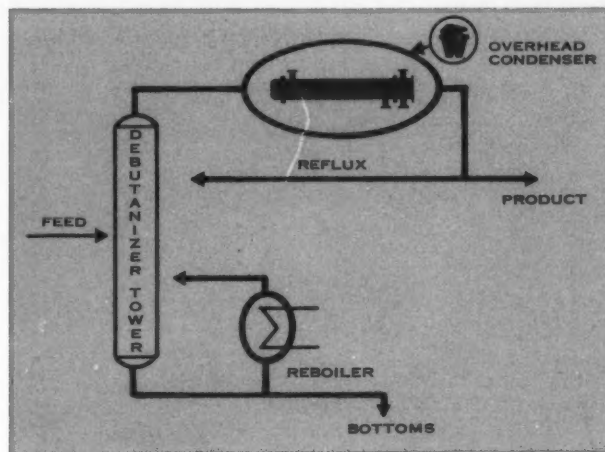


It's pretty hard, for example, to ignore a 33% increase in throughput, particularly when it was obtained simply by retubing an existing overhead debutanizer condenser. In describing this increase to me, the Chief Processing Engineer of a large Midwest refinery, declared that his

plant's overall U had shot up from 140 to 210.

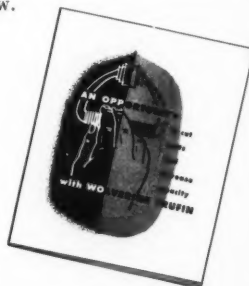
He also stated that in retubing, Wolverine Trufin was completely interchangeable with the formerly used prime surface tube. Exactly the same tools and standard tubing techniques were used. He was actually gleeful as he described how use of the integral finned tube increased the heat transfer surface area approximately 2½ times—without any increase in unit size or weight.

The principle of application of an extended surface tube to heat transfer problems has been well established for many years. However, its use in shell and tube condensers was not practical until Wolverine pioneered the use of integral finned tube. We predict that processing engineers in general are going to take a fresh look at this type of application as the good word spreads about the remarkable achievements of Wolverine Trufin Type S/T.



### Design, Operating Information Obtainable From Manufacturer

Complete information on designing with extended surface tube, actual case histories and operating and fouling data are all described in a new Trufin Opportunity Book, according to an announcement by Wolverine Tube. The company maintains a Field Engineering Service for the assistance of any refinery or equipment fabricator considering the use of finned tube in heat transfer applications. Wolverine Tube's address is given below.



Wolverine Trufin is available in Canada through  
the Unifin Tube Co., London, Ontario

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CALUMET DIVISION  
WOLVERINE TUBE DIVISION  
CANADA VULCANIZER  
& EQUIPMENT CO., LTD.  
FOREST INDUSTRIES DIVISION  
GOODMAN LUMBER CO.



### WOLVERINE TUBE

Division of Calumet & Hecla, Inc.  
1469 CENTRAL AVE., DETROIT 9, MICH.

Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes



# SURE-FIRE ANSWERS TO YOUR CONDENSER TUBE NEEDS



## PRIME SURFACE TUBE

Wolverine manufactures prime surface tubing in copper, copper-base alloys and aluminum in a wide range of sizes.



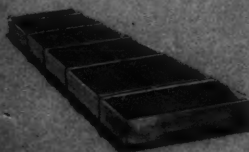
## DUPLEX PRIME SURFACE TUBE

Here's a tube designed to handle two types of corrosion simultaneously. It is composed of an outer tube of one metal and a liner of another. The combination can be of any two alloys you need to meet special corrosive conditions.



## DUPLEX TYPE S/T

This tube also is designed for specific corrosive conditions. Like Trufin, it has integral fins—will boost heat transfer efficiency.



## U-BEND PALLETS

This new Wolverine idea cuts time, reduces storage problems and saves money. U-Bend condenser tubes—either finned or prime surface—are arranged in a disposable box-type pallet in the exact order you specify. All you have to do is feed them directly from pallet to unit.



## FIELD ENGINEERING SERVICE

This is a Wolverine "extra"—a staff of highly skilled tubing technicians ready at all times to give you experienced help in problems dealing with alloys, corrosion, design or fabrication—and at no cost to you!

If you're looking for the answer to increased heat transfer efficiency, chances are you'll find it among the Wolverine condenser tubes described on this page.

Supposing, for example, that you're faced with corrosive attack on both shell and tube side. The right tube for you is Wolverine Duplex because it gives you an outer tube of one metal mechanically bonded to an inner liner of an entirely different metal. The combinations can be of any two alloys you need to stop corrosion in its tracks.

On the other hand perhaps you're concerned with a lack of space—would like to reduce your replacement tube inventory. In this case just specify Wolverine U-Bend condenser tubes—you'll not only reduce inventory but you'll also slash retubing time.

One metal or two—finned or prime surface—you'll find that Wolverine has done its level best to help you come up with the right answer. It's the type of program that comes from years of metalworking experience plus a thorough knowledge of an industry's needs.

And if you're not quite sure where your trouble lies, Wolverine's Field Engineering Service can help you. FES is a staff of highly trained tubing technicians skilled in matters of corrosion, alloy selection, design, or fabrication. For complete information just write for Wolverine's Condenser Tube Catalog. It's yours without obligation.

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Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

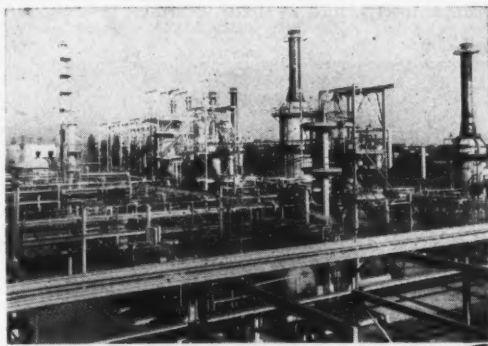
569W74—J 5372

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

EXPORT DEPT., 13 E. 40th St., NEW YORK 18, N.Y.

### New catalytic reforming process produces 100-octane clear gasoline

New catalytic reforming process is capable of producing the high-octane gasoline needed to meet demands of the more efficient automobile engines expected in the near future. Known as Powerform-



Powerforming unit in operation at Baltimore refinery of Esso Standard Oil Company

ing, the fixed-bed cyclic process uses a platinum catalyst and four, five, or six reactors. Cycle of any one reactor varies from five to 15 days. Three, four, or five reactors can be on stream while one is being regenerated.

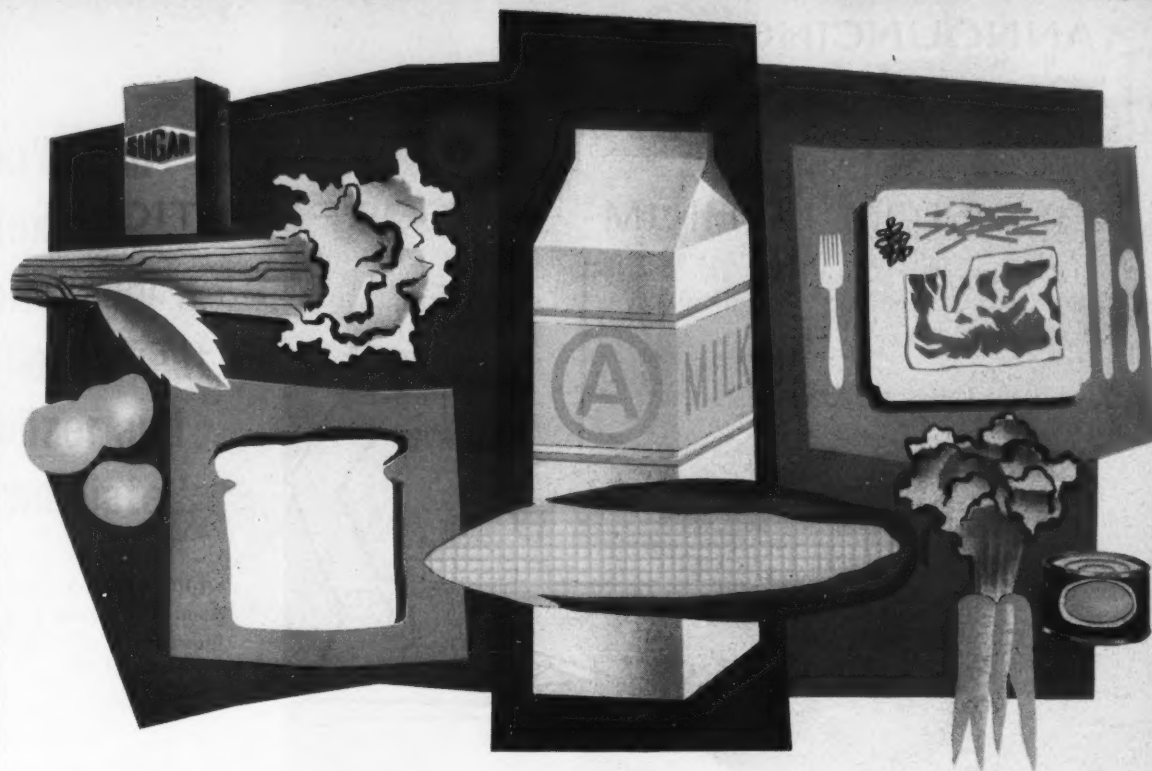
Typical feeds consist of low-octane virgin naphtha or cracked naphtha-virgin blend. Good results have also been obtained with blends containing fluid coking naphtha. Hydrofining of feed stocks is not necessary but is generally preferred. The process also gives high hydrogen yield. Operating results for specific feed stocks are as follows:

Feed Stock	Light Arabian	Heavy Arabian	Mixed Louisiana	Heavy W. Texas
Research Octane,				
Clear	95.0	100.0	98.0	98.0
+3CC	100.5	103.0	103.0	102.0
Motor Octane,				
Clear	85.5	88.5	88.0	87.0
+3CC	92.0	93.5	93.0	92.0
Yields,				
C <sub>4</sub> +, Vol %	72.5	69.0	72.5	81.0
C <sub>4</sub> , Vol %	10.5	11.5	10.5	6.5
C <sub>1</sub> -C <sub>3</sub> , Wt %	12.5	16.5	12.0	8.5
H <sub>2</sub> , Wt %	1.4	0.7	1.8	1.8
H <sub>2</sub> , scf/bbl	680.0	350.0	880.0	930.0

Two Powerformers are now in operation and 14 more are under construction or being planned.

(Powerforming process was developed by Esso Research and Engineering Company, Dept. CP, 15 West 51st Street, New York 19, New York.)

For more information on product at left, specify 7449 . . . see information request blank opposite last page.



## Process Equipment to Meet the Strictest Codes ? Ask the Food Industry

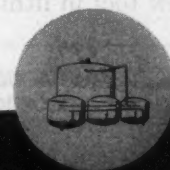
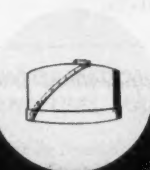
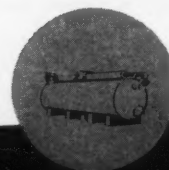
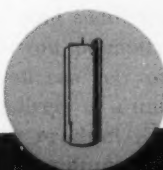
Consider the task that food processors are confronted with in preparing the food we eat daily. Tons of meat and vegetable products must be carefully prepared, seasoned and packaged. The job is tremendous, yet each detail requires painstaking attention to quality control.

Consequently, when engineers responsible for food process equipment turn to Chicago Steel Tank Company for their equipment needs, their requirements are for work produced to the highest

standards in the industry. Our long experience in working to the strictest codes and our specialization in alloy fabrication has equipped us both in terms of skilled personnel and facilities to meet these needs. For example, alloy products are fabricated at C.S.T. in a separate building in order to eliminate the possibility of contamination from carbon pick-up.

If you are responsible for specifying alloy equipment, or if you engineer this equipment for the process industries, take a tip from the Food Industry, call on Chicago Steel Tank Company to fabricate it for you.

Write for booklet which illustrates and describes Chicago Steel Tank Products



Fabricators and erectors since 1899.

**CHICAGO STEEL TANK COMPANY**

division of U. S. INDUSTRIES, INC.

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51 E. 42ND STREET • NEW YORK, N. Y. • MU 7-9298



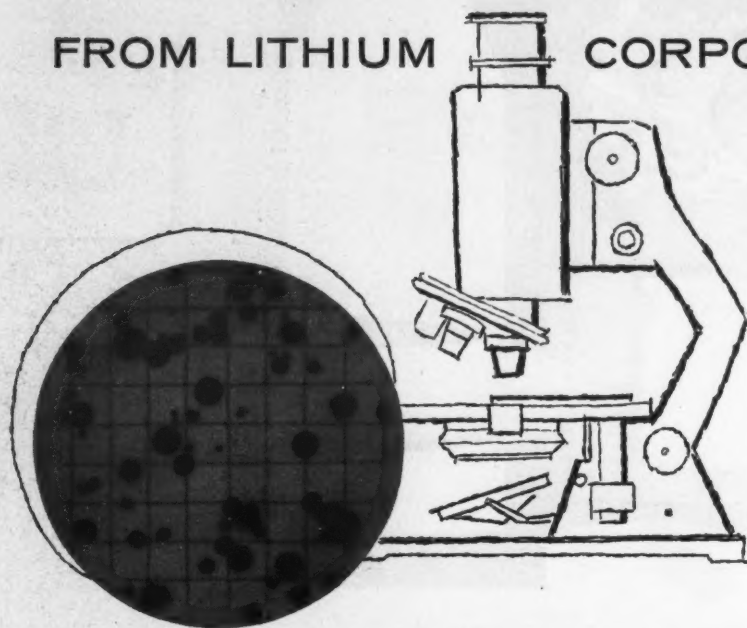
When inquiring check 7450 opposite last page



ANNOUNCING A NEW

## RESEARCH TOOL

FROM LITHIUM CORPORATION...



## LITHIUM DISPERSIONS

Our successful development of dispersions of Lithium Metal offers industry still another research technique once considered impractical. Readily prepared, lithium dispersions prove more stable to air and moisture than the metal itself due to the coating of the dispersing medium.

In case you have a problem requiring the use of highly reactive Lithium Metal, Lithium Corporation's PR&D department is making available product data sheets describing the methods for laboratory preparation of these lithium metal dispersions in such dispersing mediums as mineral oil, petrolatum and wax. A request attached to your letterhead will bring you information on this new tool in lithium research.

*... trends ahead in industrial applications for lithium*



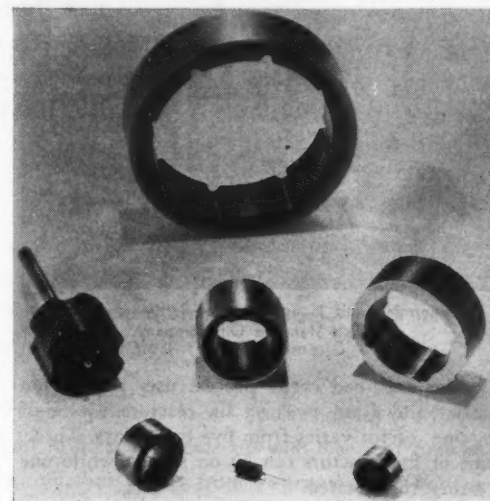
MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Ames Area, Quebec • BRANCH SALES OFFICES: New York  
Pittsburgh • Chicago • CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check 7451 opposite last page

### IDEAS

#### **No machining is necessary on pressed plastic-bound permanent magnets**

Originally developed in Germany, low-cost pressed plastic-bound permanent magnets are now available in the US. Method of manufacture makes it possible to economically produce intricate designs on a mass production basis. All machining is eliminated. Mechanical inserts, such as shafts, bearings, pole pieces,



Pressed plastic-bound permanent magnets can be economically produced in many intricate designs

temperature-compensation pieces, etc., can be molded with the magnet in one operation. Other advantages reported are: high-precision magnetic tolerances; lower aging requirements; and where applicable, cost reduction of entire magnet systems. Magnets range in weight from 1/50 to 4 ounces.

(Magnets are available in US from Baermann-Nord Corporation, Dept. CP, Amherst, Ohio . . . or for more information check 7452 on Reader Service slip which is located opposite last page.)

#### **Third edition of "ASTM Standards on Light Metals and Alloys"**

Specifications and methods of tests for light metals and alloys, cast and wrought, are included in 276-page book. Standards include ingots, castings, bars, rods, wire, forgings, etc. Also included is ASTM codification system for light metals and alloys.

To obtain third edition of "ASTM Standards on Light Metals and Alloys, Cast and Wrought" remit \$3.50 direct to ASTM Headquarters, Dept. CP, 1916 Race St., Philadelphia 3, Pennsylvania.

**Course to cover analysis  
of gaseous, vaporizable  
liquid mixtures**

Two-week courses in the analysis of gaseous and vaporizable liquid mixtures, using latest apparatus and techniques, will commence September 24, 1956, at the Podbielniak Institute, Chicago, Illinois. Courses are expected to serve as clearing house on analytical difficulties, their best solutions, most efficient analytical techniques, and suggestions for improvements. Tuition is \$500.00

(For more information on courses contact registrar, Podbielniak Institute, Dept. CP, 341 East Ohio Street, Chicago 11, Illinois.)

**Solar energy library**

Library devoted exclusively to solar energy is in operation at Phoenix, Arizona. Library contains more than 2500 references in the form of technical papers, articles, and patents — all dealing with solar energy research and development. Also in the library are the few books which currently exist on the subject.

(Solar energy library is operated by Association for Applied Solar Energy, Dept. CP, 204 Heard Building, Phoenix, Arizona.)

**Explosion chambers  
covered in folder**

Four-page folder describes explosion test chambers for simulation of explosions of any desired magnitude and pressures of any altitude up to 80,000 feet.

"Explosion Chambers" is issued by Tenney Engineering, Inc., Dept. CP, 1090 Springfield Rd., Union, N. J. Specify 7453 on form opposite last page.

For more information on product at right, specify 7454 . . . see information request blank opposite last page. ➡

**"You'll find  
'Hexalin'®  
cyclohexanol a  
versatile solvent,  
stabilizer and  
intermediate"**

"It's a particularly good solvent for gums, resins and waxes. And many other uses for 'Hexalin' are growing, too," reports Fred Wolff, Du Pont Polychemicals representative in Illinois and eastern Iowa.

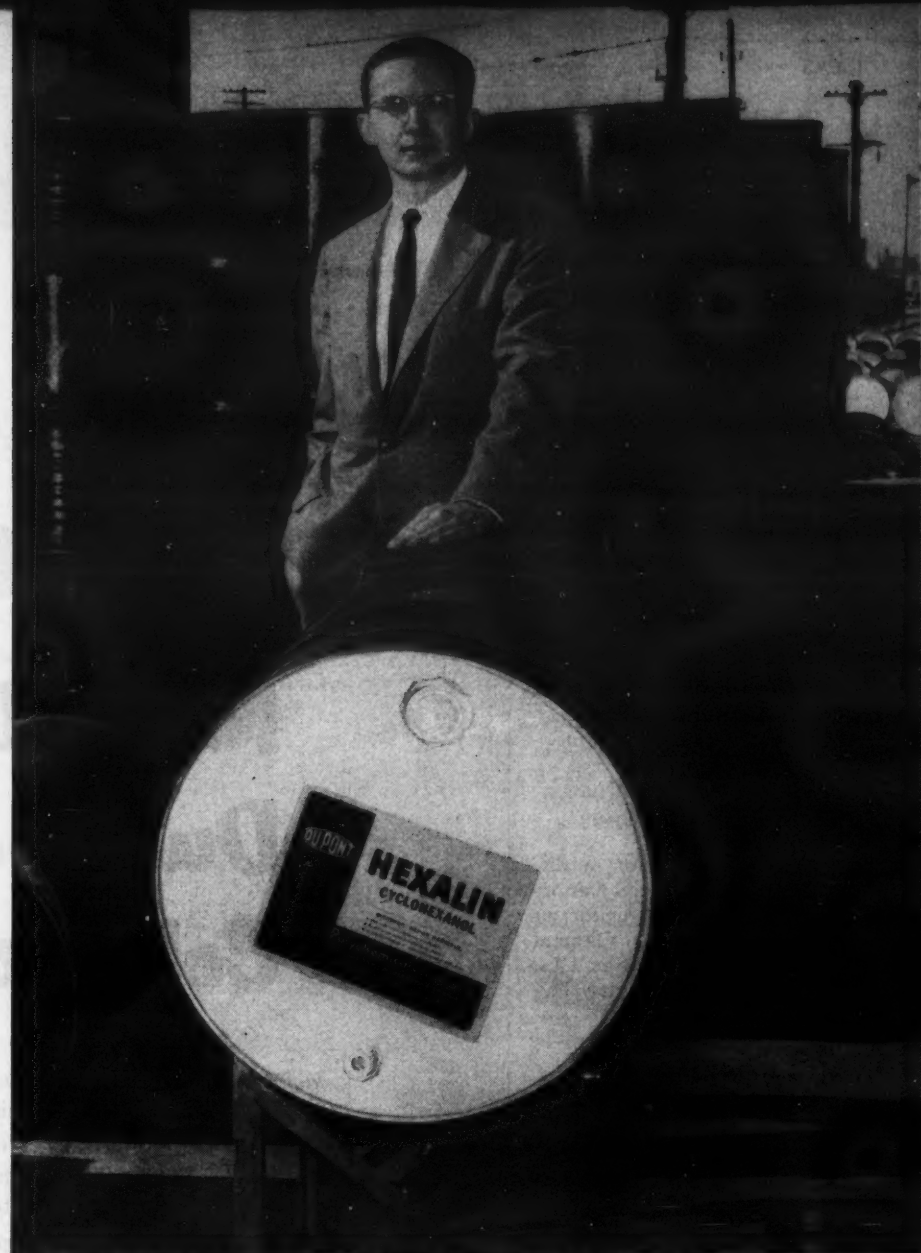
In the plastics field, "Hexalin" is reacted with organic acids to form esters for use in plasticizers. In textiles, it's a proven stabilizer for soaps and a solvent for dyes. Lacquers, varnishes, non-corrosive degreasing agents and thinners for petroleum additives are other products where the solvent power of "Hexalin" is useful in industry.

Are there any ideas here for you? To refresh your memory: "Hexalin" cyclohexanol is a clear, oily liquid with a boiling range at 760 mm. of 160.0°C. Min. to 162.4°C. Max. Its specific gravity (25°/25°C.) is 0.946-0.950.

We'll be glad to send additional information on to you promptly. And, remember, you can rely on Du Pont for fast delivery of a uniform, high-quality product . . . whether in tank cars or drums.



BETTER THINGS FOR BETTER LIVING  
...THROUGH CHEMISTRY



FRED WOLFF is sales representative for the Du Pont Polychemicals Department in Illinois and eastern Iowa. Fred received his chemical engineering training at Princeton and Massachu-

setts Institute of Technology. Like his fellow salesmen, Fred works closely with customers throughout his territory in determining individual chemical requirements.

**FOR ADDITIONAL INFORMATION ON SPECIFICATIONS,  
PROPERTIES AND USES, MAIL THIS COUPON**

Which of these  
other chemicals are  
you interested in?

- ☐ ADIPIC ACID
- ☐ CRYSTAL AND SHOTTED UREA
- ☐ DIGLYCOLIC ACID
- ☐ HYDROXYACETIC ACID
- ☐ "HYTROL"® O CYCLOHEXANONE
- ☐ "LOROL"® FATTY ALCOHOLS
- ☐ METHANOL

E. I. du Pont de Nemours & Co. (Inc.)  
Polychemicals Dept. 589, Wilmington 98, Del.

Please send me full information on Du Pont "Hexalin" cyclohexanol. I am particularly interested in using "Hexalin" for the following applications:

Name \_\_\_\_\_ Position \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



**Tung oil research contract awarded to Naugatuck**

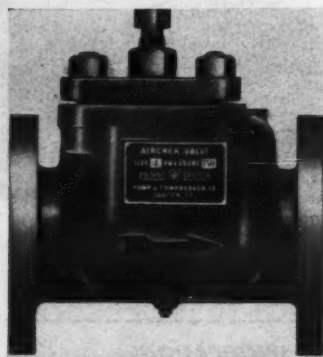
Naugatuck Chemical Division of US Rubber Company, Naugatuck, Conn., has been given a contract by the US Department of Agriculture to investigate incorporation of tung oil and tung fatty acids in polyester resins to develop new high-strength resins for various industrial uses. Contract covers one year. Project is part of overall program for developing new uses for the oil.

(Information courtesy of US Department of Agriculture, Dept. CP, Washington 25, D. C.)

**Chattering and noise from 2 compressors eliminated...**

check valves used successfully at Olin Mathieson

Vibration was excessive in discharge lines of two compressors operated on plant instrument air system at Olin Mathieson Chemical Corporation, Lake Charles, La. This caused considerable chattering and noise.



Check valve is inserted in discharge line

In March 1954, a 4" check valve was installed in discharge line of each compressor. Units installed use ring-plate design, air-cushion valves arranged in a suitable housing to automatically prevent reverse flow. Durable stainless steel discs and springs are able to meet pressure

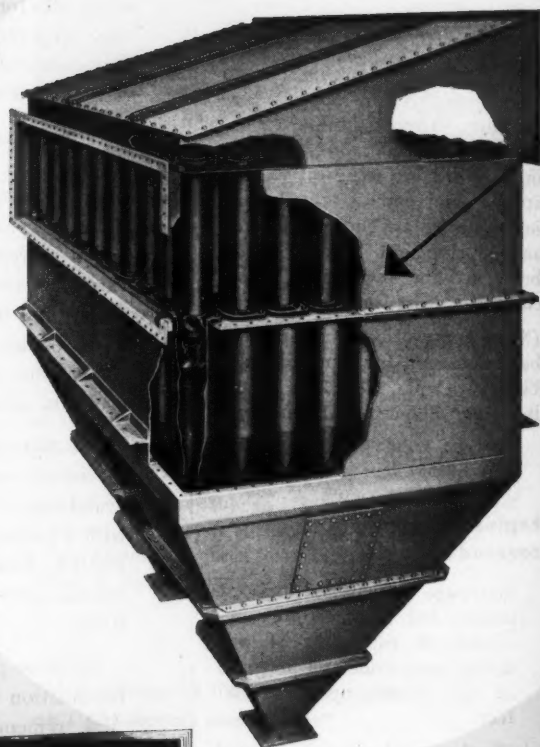
# NEW

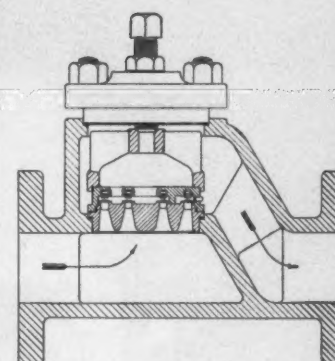
## Cyclo-trell

### Multiple Tube Dust Collector

Here are a few brief facts on Research's new multiple tube mechanical collector.

- Collection efficiencies are higher, for a given pressure drop, than other conventional multiple tube collectors.
- Gas flow per tube is higher than conventional units. This means fewer tubes per collector and lower total cost for a given capacity.
- Cyclo-trell's design is based on Research's 45 years experience in manufacturing gas cleaning equipment. As the largest manufacturer of electrical precipitators in the world, Research-Cottrell has engineered and built many combination units consisting of precipitators and mechanical collectors.
- Bulletin M gives complete details on design features, efficiency, capacity and detailed dimensional drawings. Write for your copy today.





Cross-section of check valve

requirements up to 600 psig, temperatures up to 450°F.

According to J. P. Tucker, Engineering Supervisor, chattering and noise previously experienced have been eliminated.

(Airchek valves are product of Pennsylvania Pump & Compressor Co., Dept. CP, Easton, Pa. . . . or check 7455 on form opposite last page.)



"2 Sigmas he don't."

Ben Luberoff, CP reader and research chemist in Stamford, Conn., gets credit for this cartoon idea.

For more information on product at left, specify 7456 . . . see information request blank opposite last page.

Outlet Tube

High Velocity  
Inlet Vanes

Outlet  
Recovery Vanes

Inlet Tube

### Higher Collection Efficiency

An important reason for Cyclo-trell's higher collection efficiency is the aerodynamically shaped inlet vane unit. The purpose of these vanes is to produce a fast spiral of incoming gas. The faster these gases spin, the greater the centrifugal force on the suspended dust.

After testing many types and curvatures of vanes, Research found that this new design resulted in less turbulence, greater centrifugal force and higher collection efficiencies.

### Greater Gas Handling Capacity

To develop a higher gas flow capacity than other multiple tube collectors, Research's engineers developed the following design features. First, by using a 10" diameter inlet tube, instead of the conventional 9" tube, the flow of incoming gas was increased.

The next step was to straighten the gas flow as it entered the outlet tube, since a spiraling gas stream creates more resistance than a straight through flow. In the Cyclo-trell this spiral is eliminated, and energy is recovered in the outlet tube by the Outlet Recovery Vanes. By positioning these vanes below the tube, rather than inside the tube, resistance has been further reduced.

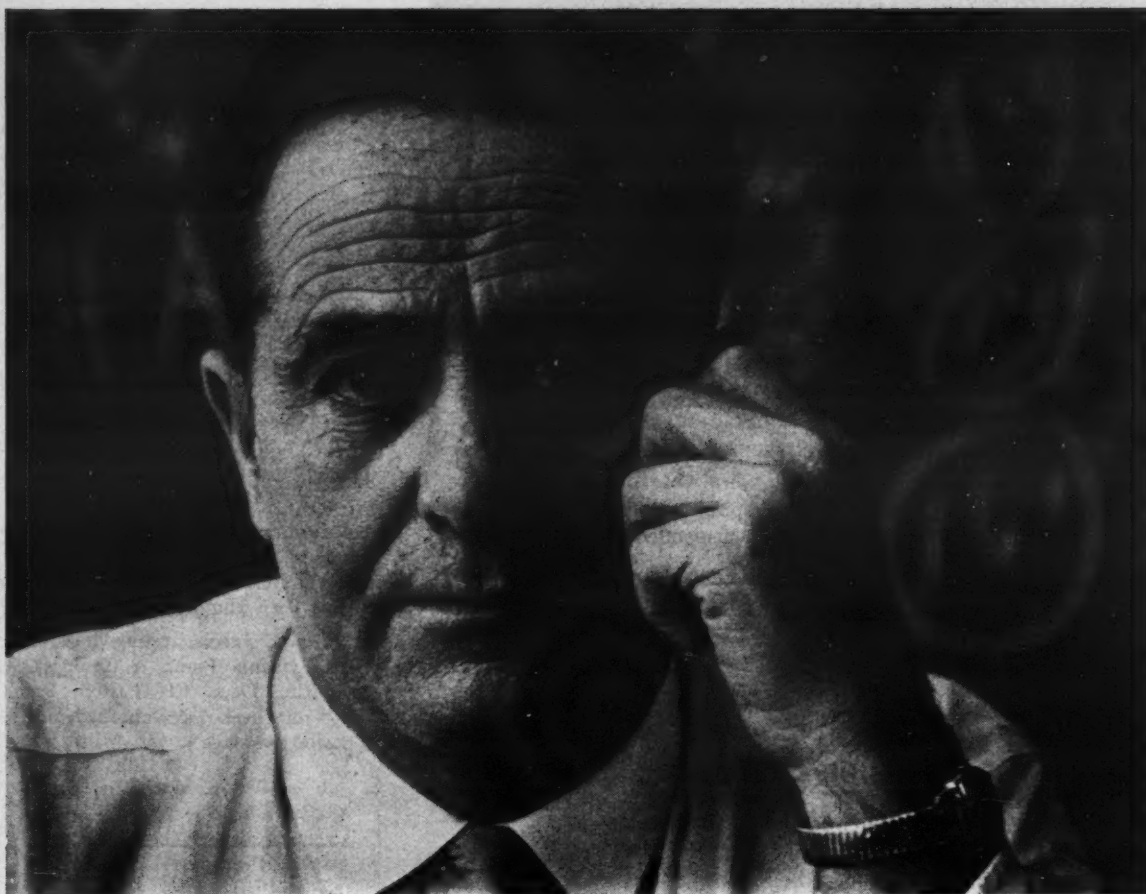
This combination of features means greater gas flow per tube, fewer tubes per collector and a lower total cost for a given capacity and efficiency.

# Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, New Jersey • 405 Lexington Ave., New York 17, N. Y.

Grant Building, Pittsburgh 19, Penna., 228 No. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.





## The Glycol Diethers bring out the best in our Mr. Rinelli... profit by it

Around Ansul we seldom see the *businessman* half of Bill Rinelli. He is usually so busy being Director of our Market Research and Development Division that this particular talent rarely comes to the fore. Some of our customers know differently. When working on a glycol diether application problem, Bill almost always wears two hats, *businessman* and *chemist*. He has helped to develop a number of marketable and highly profitable products using the glycol diethers. Examine these solvents carefully, then decide which Bill Rinelli you can use—businessman or chemist, or both. Write directly to him. Be sure to ask for a copy of our Glycol Diether Technical Bulletin. THE ANSUL CHEMICAL COMPANY, DEPT. CP-9 MARINETTE, WISCONSIN.

ANSUL GLYCOL DIETHERS	
121	Dimethyl Ether of Ethylene Glycol $\text{CH}_3\text{OCH}_2\text{CH}_2\text{OCH}_3$ (1, 2 Dimethoxy, Ethane)
141	Diethylene Glycol Dimethyl Ether $\text{CH}_3(\text{OCH}_2\text{CH}_2)_2\text{OCH}_3$
161	Triethylene Glycol Dimethyl Ether $\text{CH}_3(\text{OCH}_2\text{CH}_2)_3\text{OCH}_3$
181	Tetraethylene Glycol Dimethyl Ether $\text{CH}_3(\text{OCH}_2\text{CH}_2)_4\text{OCH}_3$ (Dimethoxy Tetraethylene Glycol)
222	Ethylene Glycol Diethyl Ether $\text{C}_2\text{H}_5\text{OCH}_2\text{CH}_2\text{OC}_2\text{H}_5$



When inquiring check 7457 opposite last page

## IDEAS

### New interest in "fuel cells" — units produce electricity direct from fuels

Cells offer possibility of becoming practical source of electrical energy

Although work has been conducted on them for over 100 years, recent advancements made with "fuel cells" have renewed the possibility of using them as a practical source of electrical energy — perhaps competitive to the nuclear reactor. Main

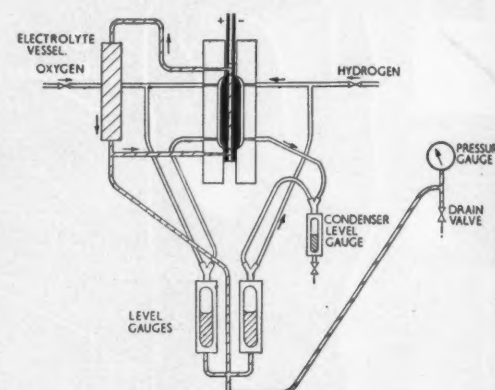
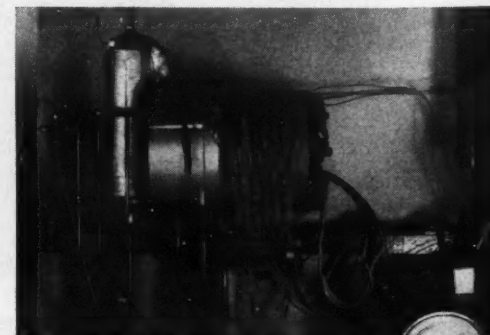


Diagram of main parts of hydrogen-oxygen fuel cell

feature of the cells is that they are capable of converting the free energy of combustion of a fuel directly into electrical energy, by-passing need for steam generation. Problems still to be solved are relative short life and low current densities.

One unit on which great progress is being made is the hydrogen-oxygen cell. Professor Justi of The Technical High School at Brunswick, Germany, has obtained efficiencies of over 80 percent with such a unit — as compared to 30-40 percent



An experimental hydrogen-oxygen fuel cell. Unit has total of six cells, can produce 150 watts

achieved by conventional steam generating methods. Cell consists of two metal, or metal-oxide electrodes kept saturated with hydrogen and oxygen respectively. Operation is simply a reversal of the electrolysis of water. Electrical energy is produced during the oxidation of hydrogen to water. Current is carried between electrodes by an electrolyte.

Mr. F. T. Bacon of Cambridge University is using a similar cell made of porous nickel electrodes. An alkaline solution is used as the electrolyte. Device operates best at 200°C and 600 psi. Cell is circular in design, about five inches in diameter. Other components are made of nickel and nickel-plated steel. The two halves of the cell are joined together with insulated bolts. Cells using electrodes made of porous nickel and porous coal have produced efficiencies of 70 percent. Further improvements are being made through use of pre-oxidized nickel.

Another cell on which progress is being made is water-fueled. Experiments made in Great Britain and Germany show that when sea water and fresh water are separated in the cell by thin organic membranes, an electrical potential is set up at each membrane. This type of cell is the same as that used for producing fresh water from sea water, but works conversely.

#### Particle bank established by research group

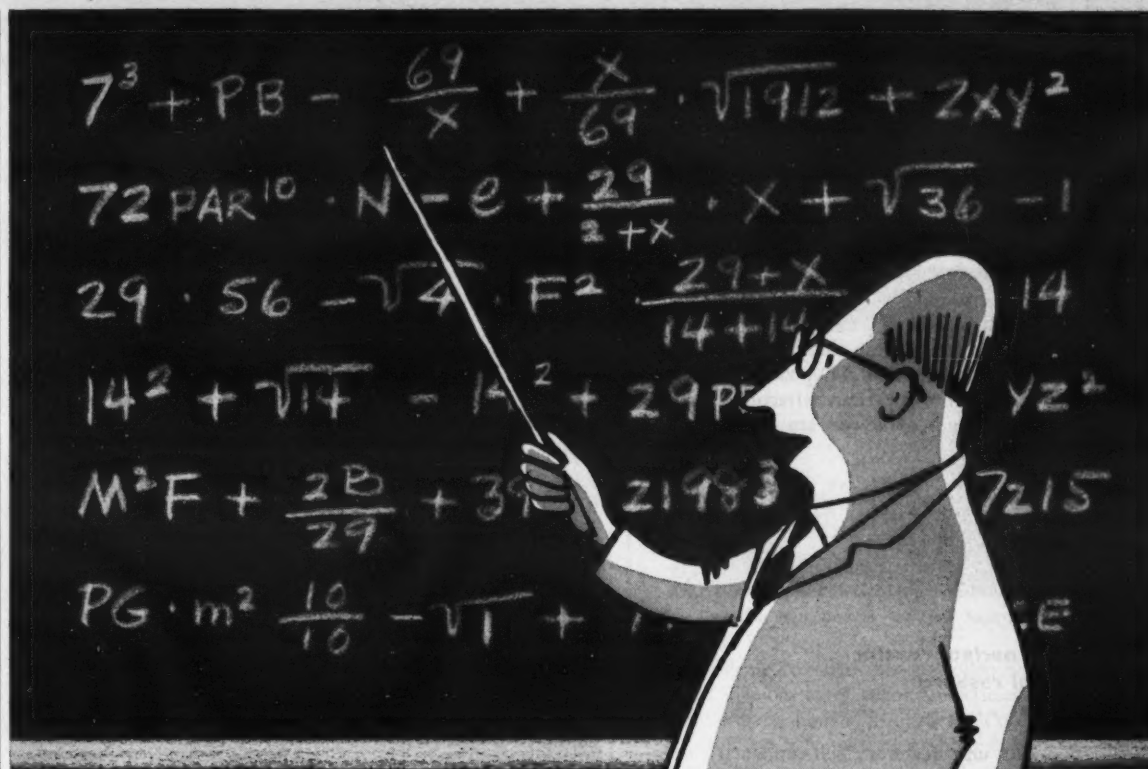
A particle bank — with "deposits" ranging in size from milligrams to pounds of selected powder samples — has been established by Stanford Research Institute. The bank is accumulating and distributing wide variety of powders for research uses by university, industrial, and government laboratories. Researchers make use of distinctive properties of the the sample materials. Of great interest are particle size distribution, surface area, and chemical and mineralogical composition.

(Information courtesy of Stanford Research Institute, Dept. CP, Menlo Park, California . . . or for more information check 7458 opposite last page.)

#### Models for process and power plants described in eight-page booklet

Three-dimensional engineering and design models for process and power plants are described in eight-page booklet. Plotting models, wire-and-washer models, and detailed scale models are discussed and illustrated.

Booklet on plant models is issued by Atkins & Merrill, Inc., Dept. CP, So. Sudbury, Mass. When inquiring specify 7459 on form opp. last page.



## When we say "SERVICE" ...we prove it!

Over the past fifty years, we have spared no effort to prove to our customers that ours is an exceptional concept of service when it comes to supplying white oils, petrolatums and petroleum sulfonates.

As proof of this contention, we have grown steadily, until today we are among the world's largest *specialists* producing these products. As such . . .

- we have a wealth of experience accrued over many years that we are ready to place at your disposal.
- we maintain laboratory facilities to help our customers solve their individual problems.
- we offer a wide range of these products—and will tailor-make them, if necessary, to meet your specific requirements.

. . . That our concept of service fits in with your needs, we stand ready to prove . . . if you will but telephone, wire, write, or fill in the coupon!



L. SONNEBORN SONS, INC. • NEW YORK 10, N. Y.

• • • • •

• White Oil, Petrolatum & Sulfonate Div.  
• L. SONNEBORN SONS, INC., Dept. CP-9  
• 300 Fourth Avenue, New York 10, N. Y.

• Gentlemen:

• Will you please send me Technical Data on the following:

• ☐ "General Information on White Mineral Oils"  
• I.R. Bulletin "A"

• ☐ "General Information on Petrolatums"  
• I.R. Bulletin "B"

• ☐ "General Information on Petroleum Sulfonates"  
• I.R. Bulletin "G"

• What can you do to help me solve this problem?

• \_\_\_\_\_

• \_\_\_\_\_

• \_\_\_\_\_

• Name.....

• Company.....

• Address.....

• City.....Zone.....State.....

When inquiring check 7460 opposite last page



**Extraction plant for Belgian Congo  
will reduce shipping costs  
of pyrethrin**

A \$500,000 processing plant for pyrethrum flowers is planned for completion in late 1957, in Goma, Belgian Congo, Africa. Extraction of pyrethrin, an effective insecticide that is harmless to humans and animals, will be performed by the continuous solvent process. Plant will handle 6½ tons of flowers each day and will make possible the shipment of a few pounds of extract in place of 440-pound bales of flowers now consigned to American extraction plants. About 8 million pounds of flowers are imported by US each year.

(Information courtesy of African Pyrethrum Development, Inc., Dept. CP, 65 Pine St., New York 5, N.Y.)

**First private nuclear reactor  
for industrial research  
in operation . . .**

50,000-watt unit features "self-contained" design for operating in densely-populated area

Located practically in the heart of Chicago, the nation's first private nuclear reactor for industrial research has been completed and "gone critical". Housed in a room 48' long, 72' wide, and 30' high, in the physics and electrical engineering research



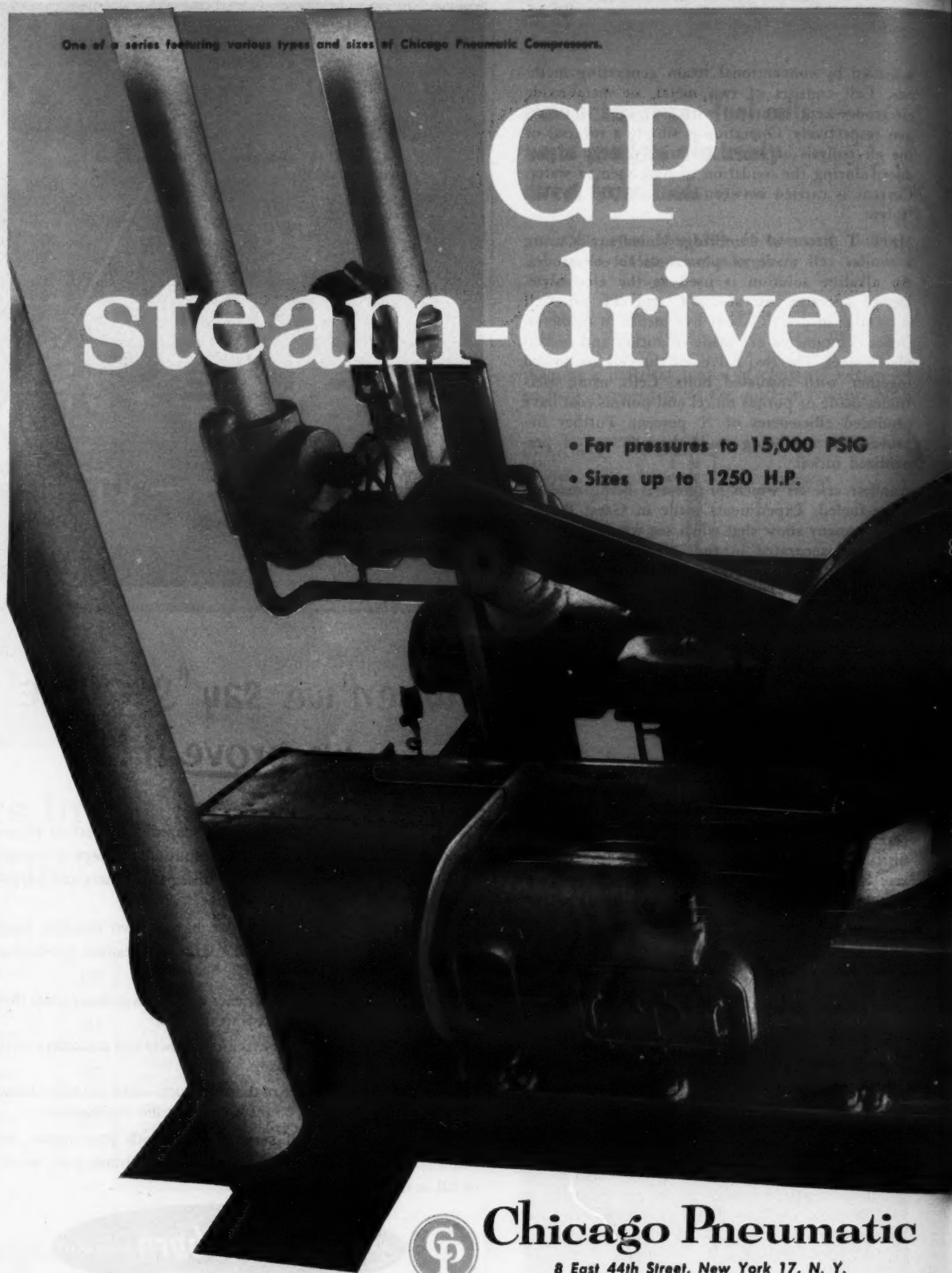
Fission takes place in 1'-diameter stainless steel sphere reactor core

building of Armour Research Foundation on the campus of Illinois Institute of Technology, the 50,000-watt reactor is intended solely for peacetime use by industry. Probably the most frequent use will be in the production of radioactive samples. It will not be used to generate electrical power.

One of a series featuring various types and sizes of Chicago Pneumatic Compressors.

# CP steam-driven

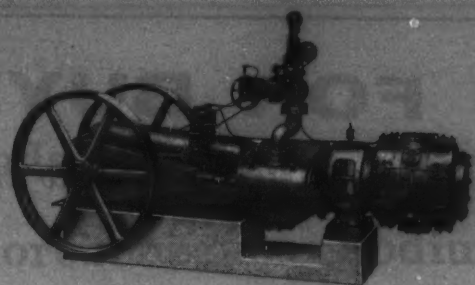
- For pressures to 15,000 PSIG
- Sizes up to 1250 H.P.



**Chicago Pneumatic**

8 East 44th Street, New York 17, N. Y.

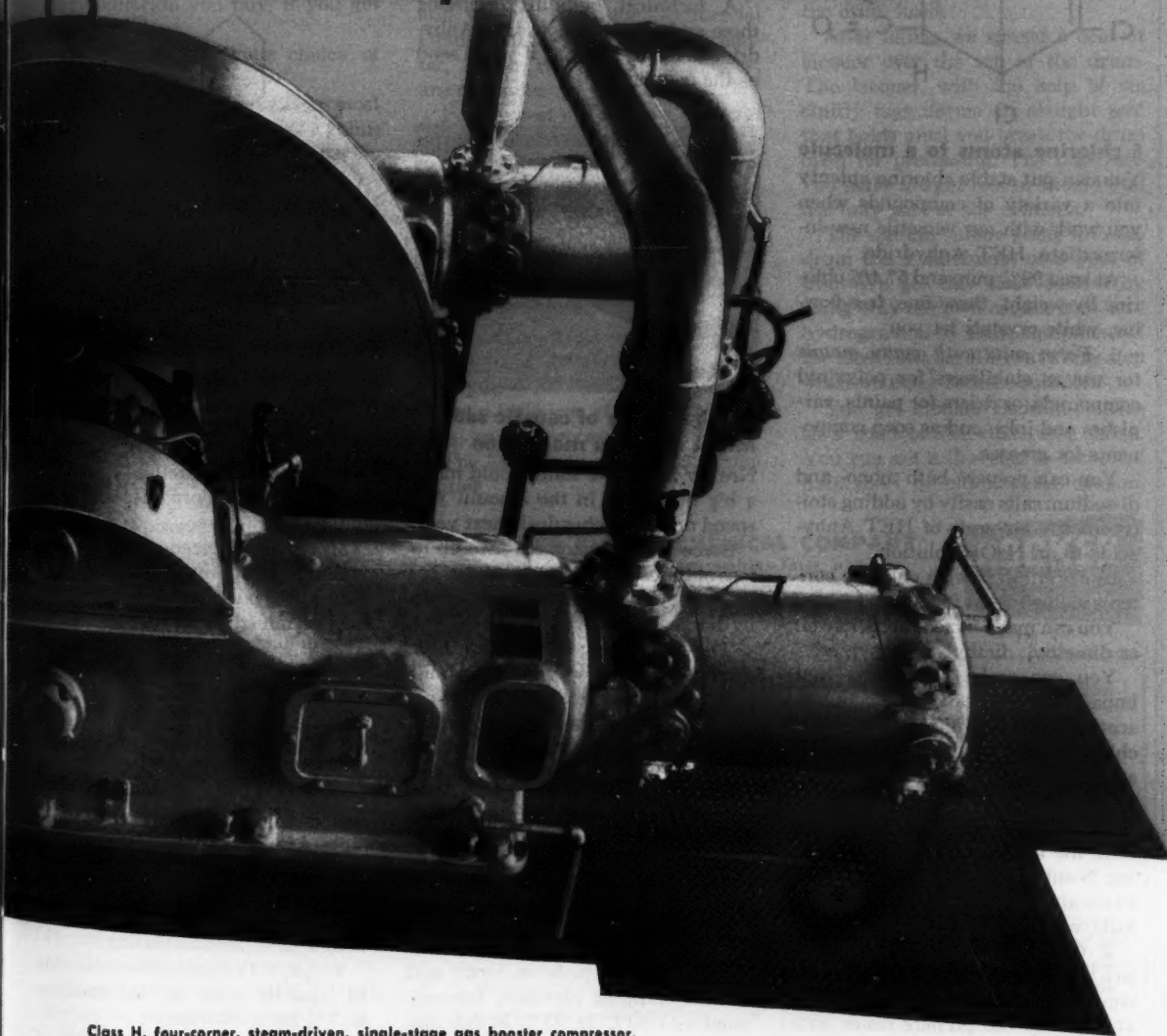
AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS



Class T single-stage, horizontal, straight-line, steam-driven compressor. Also available in two- and three-stage designs.

# compressors

**...for the process industries**



Class H, four-corner, steam-driven, single-stage gas booster compressor.

When inquiring check 7461 opposite last page

Reactor is a homogeneous boiling-water-type producing maximum thermal neutron flux of about  $2 \times 10^{13}$  neutrons/cm<sup>2</sup>/sec. Fuel consists of enriched uranium, in form of uranyl sulfate, dissolved in ordinary water which serves as moderator. Reactor is shielded with



Reactor is housed in 4x7x10' high air-tight room

5' of dense concrete and controlled with boron steel rods. Fission takes place in stainless steel sphere reactor core, about 1' in diameter. Core is surrounded by an 8 x 5 x 5' stack of graphite bars which acts as a reflector.

A feature of the reactor is its "self-contained" design which confines all radioactivity within the shield. No gaseous or liquid materials are exhausted or discharged. Hydrogen and oxygen resulting from radiolysis of water are handled in a completely closed stainless steel plumbing system. A metallic envelope totally surrounds the reactor core and plumbing system. Reactor room is air-tight.

Twenty-four industrial companies are participating in the nuclear reactor research program at Armour Research Foundation. Each firm contributed \$20,000 toward the construction and operation of the \$700,000 reactor facility. ARF is providing the remaining funds.

(Nuclear reactor was designed and built by Atomics International, a Division of North American Aviation, Inc., Dept. CP, International Airport, Los Angeles 45, California . . . or for more information check 7462 on form opposite last page.)

## why is this magazine so "different"?

Maybe you have wondered why this magazine, **CHEMICAL PROCESSING**, has such an unusual format? Or why its articles are so terse, short, to-the-point?

The Editors explain how this benefits you — page 100.



**Vibration trouble eliminated  
from two compressors  
with check valves . . .**

valves also simplify starting up, shutting down operations of compressors

**Problem:** Considerable vibration in discharge lines of two 960-cfm compressors made it difficult to keep pipe joints tight. This vibration was transmitted to the building members of the entire building, which was objectionable. Compressors are in service at Addressograph-Multigraph Corp., Cleveland, Ohio.



Air-check valve was installed between high-pressure cylinder and aftercooler of compressor

Numerous changes in pipe support and anchoring were made without the vibration being reduced to a satisfactory level.

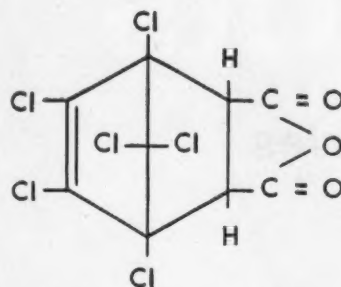
**Solution:** In early 1954, one 6" air-check valve was installed between the high-pressure cylinder and the aftercooler of one compressor. Later another valve of the same type was installed on the other compressor.

Check valves installed employ ring-plate-design, air-cushion valves arranged in a suitable housing to automatically prevent reverse flow. Durable stainless steel discs and springs are able to meet pressure requirements up to 600 psig, temperatures up to 450°F.

**Results:** According to K. W. Scott, Plant Engineer, vibration due to pipe pulsation has been reduced to a minimum. No trouble is experienced now. Also, after check valves were installed, plant was able to remove hand-operated stop valve on

## BRIEFS FOR BUYERS

about HET® Anhydride, new intermediate



### 6 chlorine atoms to a molecule

You can put stable chlorine aplenty into a variety of compounds when you work with our versatile new intermediate, HET Anhydride.

At least 99% pure and 57.4% chlorine by weight, these fine, free-flowing, white crystals let you:

1. *Form salts with many metals* for use as stabilizers for polyvinyl compounds, as driers for paints, varnishes and inks, and as soap components for greases.

You can prepare both mono- and di-sodium salts easily by adding stoichiometric amounts of HET Anhydride to an NaOH solution.

2. *Form esters with chlorine contents as high as 51.0%.*

You can make mixed esters, as well as dimethyl, diethyl, dipropyl, etc.

You can make plasticizers that impart fire resistance to cellulose acetate, cellulose nitrate, polyvinyl chloride, polyvinyl acetate, GR-S, and other plastics and rubbers.

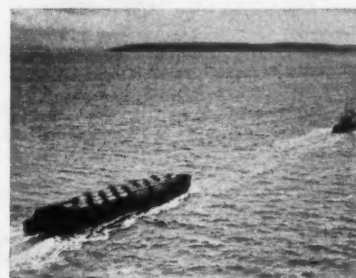
3. *Form imides.* Simple reactions with ammonia and primary amines form the imide and the corresponding N-substituted imides for use in waxes and greases, agricultural chemicals, and fungicides.

4. *Cure and harden epoxy resins* to a high degree of fire resistance and equally high heat distortion temperatures. You can prepare resins with as much as 30% stable chlorine

using HET Anhydride.

5. *Form condensation polymers* such as polyesters by removing water with polyfunctional alcohols. When cross-linked with styrene, these polymers show excellent fire resistance.

A technical bulletin discussing these and other uses of HET Anhydride in detail is yours, if you'll send us the coupon.



### Barge delivery of caustic soda might save you money too

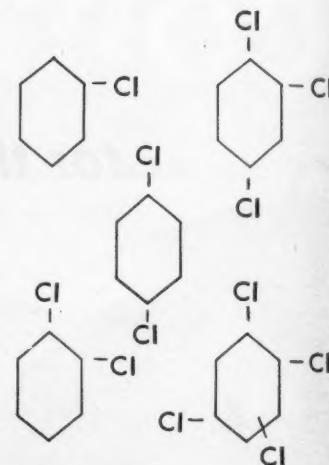
Nearby navigable water could make a big difference in the amount you spend on heavy chemicals next year.

Some of our customers save up to tens of thousands of dollars a year because they can receive more cheaply by barge.

The single barge shown here, for example, is on its way to a pulp mill with 11 tank cars of chemicals above deck and 1,000 tons of Hooker liquid caustic soda below.

Your Hooker salesman can help you find out if you can save by receiving caustic soda or other chemicals from one of our plants or stock points by barge.

For other tips on buying caustic soda economically, send for the *Caustic Soda Buyer's Guide*, a 16-page booklet of facts on forms and grades, shipping methods, the economics of 50% vs. 73% liquid, and other topics of interest to buyers.



### Chlorobenzenes . . . a specialty at Hooker

Whether you use chlorobenzenes as solvents or intermediates, you're sure of finding exactly the right formula at Hooker.

Currently we are making these five chlorobenzenes as well as dozens of other chlorinated organics and inorganics:

**Monochlorobenzene.** Liquid used as solvent and intermediate. Typically 99.5% pure monochlorobenzene as determined by cryoscopic methods.

**ortho-Dichlorobenzene, Technical.** Liquid used as solvent and intermediate. 85% to 87% pure ortho. Major impurity is para-dichlorobenzene.

**para-Dichlorobenzene.** Solid, usually used as intermediate. 100% pure. Available in 7 mesh sizes.

**Trichlorobenzene, Technical.** Liquid, usually used as solvent. Mixture of 1, 2, 4- and 1, 2, 3-trichlorobenzene with 1, 2, 4- predominating.

**1, 2, 4, 5-Tetrachlorobenzene.** Solid, usually used as intermediate. 65.7% pure chlorine.

For more information on any of

## Caustic Soda • Muriatic Acid • Lauryl Chloride Chlorobenzenes • Sodium Sulfide

these chemicals, you can get data sheets listing physical and chemical properties by sending us the coupon.

### Note on Lauryl Chloride to careful buyers

You can afford to be fussy about the lauryl chloride you buy, if you get it from Hooker.

Here, you have your choice of two grades:

The *Technical Grade* satisfies most normal requirements. It has a minimum of 15.5% chlorine. Its specific gravity is  $0.862 \pm .003$  at  $25^\circ/15.5^\circ\text{C}$ .

If your process calls for a chemical with even better credentials, we offer you a *Refined Grade*. Minimum chlorine content is stepped up to 16.0%. Specific gravity is  $0.863 \pm .002$  at  $25^\circ/15.5^\circ\text{C}$ .

Both grades are a mixture of n-alkyl chlorides ranging from  $\text{C}_{10}$  to  $\text{C}_{18}$ . The  $\text{C}_{12}$  fraction predominates, accounting for about 60 to 65% of the product.

For a complete breakdown on the physical and chemical properties of both grades, send us the coupon.

### Our muriatic acid is purer than Simon Pure



The origin of our phrase "Simon Pure" is a Quaker gentleman by that name who is a leading character in a play written some 200 years ago.

As a human he consists of about .004% iron.

Hooker White Grade Muriatic Acid is only .0001% iron. Even our Commercial Grade is a mere .0005% iron. Hence the claim we make above. "Simon Pure" isn't a good enough phrase for our muriatic acid.

Fact is, our White Grade is most

likely the purest muriatic acid you can get anywhere in volume.

It contains .003% or less of sulfates. It has absolutely no free chlorine or arsenic, and has a mere .0002% of organic matter.

For requirements only a little less stiff, we recommend the Commercial Grade: sulfates, .003%; organic matter, .001%; chlorine, a slight trace; arsenic, none.

For the rest of the story, send for our technical data sheet—which, by the way, contains a handy guide for figuring the amount of muriatic acid you need for different volumes of various Baumé solutions.

### The 1/64" answer to a sulfide problem

Let a little air get to your sodium sulfide and it saps the sulfide's strength.

Let a little iron at it and you may have serious processing problems.

The same is true of other foreign matter.

To help you avoid such problems, we take special care in the packaging of our sodium sulfide.

First, we take a brand new steel drum (we never re-use a drum). The drum has a 1/64" lining of a special lacquer to prevent iron pickup from the drum itself.

After filling, we spread a coat of lacquer over the top of the drum. The lacquer, with the help of six sturdy lugs, forms an airtight seal that holds until you break the drum open for processing. The lugs help you make a tight re-seal should you use only part of the contents.

The sodium sulfide going into the drum has a maximum of 8 ppm of iron. We get this close control by using only our own caustic soda and hydrogen and by using equipment of the most suitable alloys at every step when we make sodium sulfide.

You get Hooker Sodium Sulfide as a solid or fast-dissolving flakes. You can get a descriptive technical data sheet by clipping the coupon.

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6-1270

For more information on chemicals mentioned here, check below:

- ☐ HET Anhydride, Bulletin 43
- ☐ Caustic Soda Buyer's Guide
- ☐ Caustic Soda, technical data sheets
- Chlorobenzenes (Check which):
  - ☐ Mono- ☐ ortho-Di- ☐ para-Di-
  - ☐ Tri- ☐ 1, 2, 4, 5-Tetra-
  - ☐ Lauryl Chloride
  - ☐ Muriatic Acid
  - ☐ Sodium Sulfide

Is your file up-to-date on these other

Hooker products? Check for technical data:

- ☐ Cyclohexanol
- ☐ Methyl Cyclohexanol
- ☐ Lauryl Mercaptan
- ☐ Sodium Tetrasulfide
- ☐ Sulfuryl Chloride
- ☐ Thionyl Chloride

Clip and mail to us with your name, title, company address. When requesting samples, please use business letterhead to help speed delivery.

discharge side of each compressor. This simplifies starting up and shutting down operations. It also makes more certain that the compressors are without load during all idle periods.

(Aircheck valves are product of Pennsylvania Pump & Compressor Co., Dept. CP, Easton, Pa. . . . or for more information about manufacturers product check 7464 on form which is located opposite last page.)

### Still an unsolved economic problem — recovery of spent nuclear fuel . . .

picture confused by multiplicity of fuels used

Although fairly standard chemical techniques have been developed for recovering spent reactor fuels, spent fuels in atomic power plants is still one of the serious economic problems in utilization of fissionable material. Extensive programs are under way to make recovery easier and less costly. Present and only proven method requires dissolving the metals in nitric acid and then separating them by selective solvent extraction.

Process is relatively simple, but since plant is behind concrete barriers and must be operated remotely with extensive and expensive instrumentation, operation and maintenance are complicated. Process is further complicated by fact that spent fuel elements have to be cooled for about four months to reduce radioactivity before they are transported to processing plant. Containers for transportation are heavy casks shielded with lead. Recovered materials are blended with make-up fuel materials, fabricated with new cladding material, and shipped to storage, ready for use again in a reactor.

All calculations of fuel cycle costs at the present time are largely conjecture. The picture is confused by the multiplicity of fuels being used and considered, and the technology of processing has not been established for all the fuel systems that have been conceived.

There are eight factors however, which offer some hope of lowering costs in the future:

- 1) Higher burn-up in reactor
- 2) Lower cost of new fuel
- 3) Higher converting rates and preferably high breeding rates for fertile material
- 4) Uniformity of fuel compositions
- 5) Cheaper waste disposal means
- 6) Economic means of deriving credits in fuel cycle from valuable fission products and radiations
- 7) Greater volume through processing plants
- 8) Improved processing techniques


(Condensed from paper presented at Pittsburgh ASME nuclear power plant conference by Dr. H. B. Coats, Manager, Atomic Energy Department, Chemical Plants Division, Blaw-Knox Company, Dept. CP, 930 Fort Duquesne Blvd., Pittsburgh 30, Pa.)

When inquiring check 7465 opposite last page



# keeping up with **SODIUM**

## **METAL DESCALING USES SODIUM BY THE TON**




THE SODIUM HYDRIDE PROCESS HAS STREAMLINED DESCALING OF STAINLESS STEEL AND OTHER METALS. REASONS FOR ITS WIDE AND RAPID ACCEPTANCE: IT IS FASTER THAN PICKLING (MINUTES INSTEAD OF HOURS) • DOES NOT BITE THE METAL • USES SIMPLE, STANDARD EQUIPMENT.

THE PROCESS: HYDROGEN (USUALLY PRODUCED BY DISSOCIATING AMMONIA) IS BUBBLED THROUGH MOLTEN SODIUM TO FORM THE HYDRIDE, WHICH IS THEN DISSOLVED UP TO 2% IN A CAUSTIC BATH AT 700°C. THE METAL IS DIPPED, AND THE REDUCED SCALE THEN KNOCKED LOOSE BY COLD WATER QUENCH. SHEETS, RODS, WIRE, STRIP, STAMPINGS HAVE ALL BEEN DESCALED COMMERCIALY VIA SODIUM HYDRIDE.

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NO MATTER WHAT YOUR SODIUM APPLICATION—PLANT, PILOT OR LAB SCALE—U.S.I. MAKES THIS METAL AVAILABLE IN THE FORM AND SIZE YOU NEED.

THERE IS THE GIANT ECONOMY

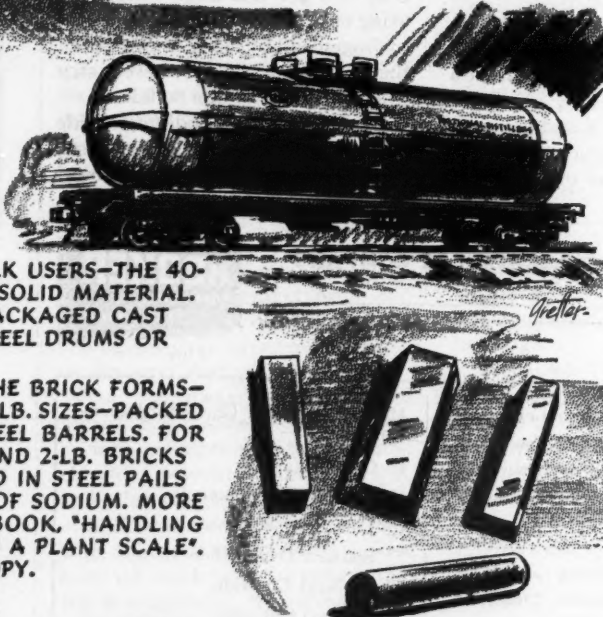


PACKAGE FOR BULK USERS—THE 40-TON TANK CAR OF SOLID MATERIAL. SODIUM IS ALSO PACKAGED CAST SOLID IN 55-GAL. STEEL DRUMS OR 5-GAL. STEEL PAILS.

THEN THERE ARE THE BRICK FORMS—IN 12, 5, 2½ AND 1-LB. SIZES—PACKED DRY IN 55-GAL. STEEL BARRELS. FOR SMALL USERS, 1- AND 2-LB. BRICKS CAN BE PURCHASED IN STEEL PAILS CONTAINING 20-LB. OF SODIUM. MORE DETAILS IN THE U.S.I. BOOK, "HANDLING METALLIC SODIUM ON A PLANT SCALE". WRITE FOR YOUR COPY.

### **Metal Strength Through Sodium**

SODIUM ADDED IN SMALL QUANTITIES (0.05%) TO ALUMINUM-SILICON CASTING ALLOY YIELDS REFINED GRAIN STRUCTURE, GIVING IMPROVED TENSILE STRENGTH AND ELONGATION. SODIUM HAS ALSO BEEN USED AS A DEOXIDIZER FOR BRASS AND COPPER AS WELL AS THE REFINING OF LEAD.



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When inquiring check 7466 opposite last page

### **IDEAS**

#### **Two-year test points out differences between operating conventional and nuclear power plants . . .**

presence of radiation results in many innovations in water technology of primary water system

Two years of operating experience with a pressurized water nuclear power plant at the National Reactor Testing Station in Idaho has brought out the differences — and similarities — between operating this type of nuclear plant and conventional steam power plants.

Essentially the same as in conventional plants is the secondary system — consisting of steam generators, turbines, condensers, and feedwater systems. Fundamental problems of fouling, corrosion, and carry-over are still present. The usual considerations govern selection and control of feedwater preparation, boiler water treatment, and steam-condensate-system corrosion inhibitors.

Some differences, however, exist in the secondary system because of the difference in boiler design. Rather than being heated by direct firing, the secondary water is heated by radioactive primary water passing through many small-diameter, thin-walled tubes. Tube failure due to overheating is impossible, but maintenance of clean heat transfer surfaces is essential. Any leakage through tubes or sheets will result in the introduction of radioactivity into secondary system.

Contamination can be readily detected by instruments, and a fairly large leak is required before serious contamination is experienced. Careful control of corrosion and oxygen pitting is required to protect the thin-walled tubes. In existing plants using austenitic stainless steel tubes, it is also considered necessary to maintain low chloride ion concentrations to avoid stress-corrosion cracking.

Major innovations in the primary loop result from the presence of radiation. Water at an average temperature of 450°F and 2000 psi is circulated at rates upwards of 10,000 gpm to pick up heat from the fuel element surfaces and transfer it to the steam generator. Any impurities in the water — either from corrosion or from feed water — become irradiated as they pass through the reactor.

To remove these impurities, a by-pass line from the primary loop leads to a sintered stainless steel filter having a mean pore size of 10 microns. A mixed-bed demineralizer of cation and anion resins is also used. Demineralized water is cooled to about 130°F and passed through another filter which traps any resin leakage. Conductivity of the treated water is about 0.3 micromhos per cm.

Experience has shown that radiation causes the zirconium-clad fuel elements to become fouled with stainless steel corrosion products. Conventional means of corrosion inhibition cannot be used because of

adverse effects of radiation on chemical additives. To remedy this situation, hydrogen is added periodically to the water. Concentration is kept at 30 cc per kg. It was noted that raising the pH of the water to about 10 also seemed to help. Tests are still being continued on this.

Make-up water for the primary system is prepared by conventional methods — demineralization and evaporation. High-pressure conductivity cell is also used to continuously monitor the cooled stream of primary water being returned to the primary loop. Measurement of insoluble corrosion product concentrations is also required. This is done by filtering a known quantity of the by-pass primary water and noting the weight increase of the filter.

Constituents not commonly measured in other water applications, which must be measured in this case, are dissolved hydrogen and nitrogen. Under the influence of nuclear radiation, hydrogen and nitrogen in the primary water react to form ammonia. In the absence of free hydrogen, nitrogen reacts with dissolved oxygen and water to form nitric acid, as evidenced by a declining pH and the formation of nitrate ion.

(Summarized from paper presented — at the 18th annual meeting of The American Power Conference, sponsored by Illinois Institute of Technology, March 21-23, 1956 — by Irving H. Welinsky, Westinghouse Electric Corporation, SFR Process Development Section, Dept. CP, Pittsburgh, Pa.)



**Gas-fired furnaces speed uranium processing**

Heat processing time for uranium ore will be cut from days to hours by the use of these automatic gas-fired furnace settings. Units are shipped complete with combustion system, ready for installation of stainless steel kettle. In operation, radiant heat and combustion products are directed at kettle bottom at short range — resulting in fast heating, efficient heat transfer, and temperature uniformity within a few degrees F.

(Duradant furnace settings are product of Selas Corporation of America, Dept. CP, Dresher, Pa. . . . for more information check 7467 on form opposite last page.)



## MANGANESE

**MANGANESE SULFATE**  
65% Mn SO<sub>4</sub>. Designed specifically for inclusion in mixed fertilizer.

**MONOHYDRATED MANGANESE SULFATE**  
93% Mn SO<sub>4</sub>·H<sub>2</sub>O. Highest purity, technical grade . . . NOT A BY-PRODUCT.

**MANGANOUS OXIDE**  
Minimum 48% Manganese as metallic. Feeds, fertilizers, spray or dust grades.

## IRON

**FERRIC IRON SULFATE**  
Partially hydrated. Granular free flowing available in bags or bulk.

**IRON OXIDE**  
Information available upon request.

## ZINC

**ZINC SULFATE**  
Monohydrated, 36% Zinc as metallic. White, free flowing powder.

**MONOHYDRATED ZINC SULFATE**  
36% Zinc as metallic. For agriculture and industry.

**ZINC OXIDE**  
Secondary Zinc Oxide.

Samples, specifications and detailed information upon request.

When inquiring check 7468 opposite last page

## COPPER

**COPPER SULFATE**  
Industrial Crystals and all common grades.

**MONOHYDRATED COPPER SULFATE**  
35% Copper as metallic packaged in steel drums at no extra cost.

**COPPER CARBONATE**  
55% Copper as metallic. Light and dense grades.

**CUPRIC CHLORIDE**  
37% Copper as metallic. Available in poly-lined drums or bags.

**CUPRIC OXIDE**  
Minimum 76½% Copper as metallic. Technical grade . . . NOT A BY-PRODUCT.

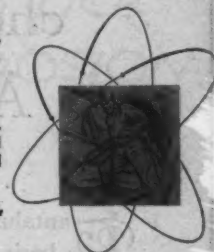
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**SULFURIC ACID**

**LIQUID SULFUR DIOXIDE**  
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Iron less than 1.0 ppm as loaded. Water white. Delivered in glass-lined tank wagons, also in stainless steel drums.

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Other organic Sulfonic Acids.



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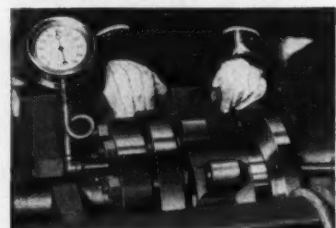
217-219 Grant Building, Atlanta, Georgia

# ADSCO

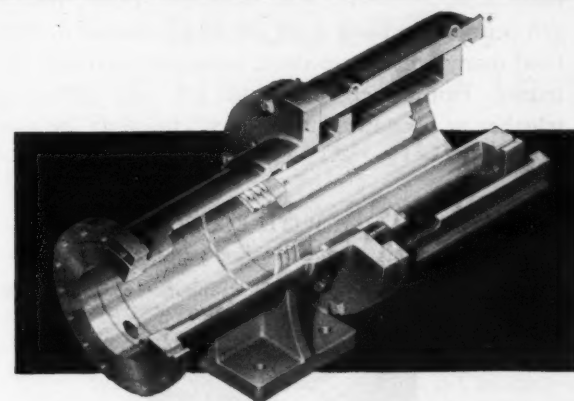
## PISTON-RING EXPANSION JOINTS

can be unpacked at full operating pressure

**PROOF** FROM THE PITTSBURGH TESTING LABORATORY



All packing has been removed. There is no trace of steam in the empty stuffing box, even though steam in the line is at 240 lbs. with 700 F total temperature.



For simple maintenance, a new ring of packing can be added to an ADSCO Piston-Ring Slip-Type Expansion Joint, but when the old packing has been allowed to become scored, it should be removed and replaced with fresh packing. The ADSCO Piston-Ring Joint is the only joint in the world in which this can be accomplished without shutting off line pressure. With the vent valve open, piston rings hold the line pressure while the joint is being serviced as in photograph at left.

Other features: The slip is continuously guided at its extreme ends

throughout its entire length of travel. Primary and secondary limit stops prevent the slip from being pulled out of the body. Openings in the external guide provide easy access to the packing gland for adjustment. The external guide is built in halves to reduce the size of manholes required in underground construction.

These ADSCO Piston-Ring Joints are available in both single and double types, in full range of sizes, with 4", 8", and 12" traverse per slip, and for temperatures to 800 F and higher.

Write for Bulletin 56-20.

**AMERICAN DISTRICT STEAM DIVISION**  
**ADSCO INDUSTRIES, INC.**

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When inquiring check 7469 opposite last page



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We recommend it  
only when it is the  
cheapest material  
AVAILABLE

Tantalum is seldom cheaper on a "per-pound" basis. But tantalum is quite often the "cheapest" material when judged on an over-all final operating cost basis, on a product purity basis, on a freedom from maintenance or an elimination of down-time basis.

We don't expect anyone to take tantalum on faith or generalities. But if you process hydrochloric acid, nitric acid, perchloric acid, bromine, iodine, hydrogen peroxide, sulfuric acid, chlorine, chlorine dioxide (and many other corrosives), tantalum may save you money. Fansteel engineers can tell you, definitely, whether or not tantalum will be "cheapest" for you.

**USE TANTALUM WITH ECONOMY** for most acid solutions and corrosive gases or vapors.

Not recommended for HF, strong alkalis or substances containing free  $\text{SO}_3$ .



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G563A

When inquiring check 7470 opposite last page

## corrosion control

Rubber-lined blower at Dow Chemical still looks and performs like new, though it's ten years old and —

## HANDLES CORROSIVE FUMES

Vented air from bromination units  
averages about 1%  $\text{HBr}$  and  $\text{Br}_2$

FRANK E. McELROY, Assistant Editor  
With GEORGE F. MEIER, Superintendent  
Bromine Products Plant  
The Dow Chemical Company, Midland, Michigan



Fig 1— $\text{HBr}$  and  $\text{Br}_2$  fumes are vented through rubber-lined stack equipped with water sprays

## FUMES AT 6000 CFM

**Problem:** In venting corrosive fumes from process equipment areas in the bromination unit at Dow Chemical, Midland, Michigan, a problem was encountered in finding a suitable blower for the exhaust system since the atmosphere contained about 1% HBr and Br<sub>2</sub>, both highly corrosive materials.

**Solution:** Fans made of a number of chemically resistant construction materials were studied. Dow's engineering department decided that a unit made of rubber-lined, hot-rolled steel would be satisfactory.

In 1946, Dow installed an industrial exhauster with a high efficiency backplate-type wheel, 27-5/16" in diameter. Inside of the housing, wheel, and exposed portion of shaft were covered with 1/8" thick Buna-S hard rubber.

Unit exhausts 6000 cfm at a 3" static pressure. Fan turns at 1183 rpm and requires 6.26 bhp. The 7 1/2 hp electric motor that powers the unit revolves at 1800 rpm and drives the blower through a Gates Rubber matched 5-belt-and-sheave arrangement.

Fumes are vented to atmosphere through a rubber-lined stack that has water spraying through it to remove contaminants. These are not recovered.

**Results:** Blower has performed satisfactorily and with little maintenance ever since it was first placed in service.

(Blowers are products of American Blower Corp., Dept. CP, Detroit 32, Mich. . . . or for more information check 7471 on form opposite last page.)

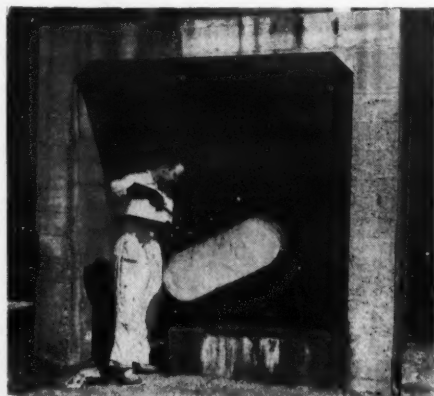


Fig 2—A member of Dow's maintenance team applies lubrication to power unit for blower

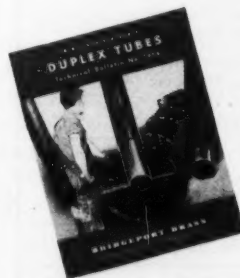


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No pipe dream! Bridgeport Duplex Tube can help you lick dual corrosion conditions in more than 101 *different* ways! Duplex Tube matches one alloy against inside corrosion and another alloy against outside corrosion. More than 101 Duplex combinations are available. Each is designed to lick a particular combination of corrosive conditions.

Whatever your corrosion problem, get in touch with Bridgeport. Write for our questionnaire which has been especially prepared to aid you in describing your corrosion problem. Our Corrosion Laboratory will be glad to help you select the tube alloys that will serve you best.



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Dual corrosion and its prevention is discussed at length in Bridgeport's Duplex Tube Handbook. Write for your copy today.

When inquiring check 7472 opposite last page



# B.F. Goodrich



Cotton Producers Association, Carrollton, Georgia.

## Rigid Koroseal pipe used for permanent installation where corrosion ruins metal in six months

**S**ULPHURIC ACID used in making super-phosphate used to be carried in heavy duty black iron pipe from tank to mixing station. The strong corrosive action of the acid made replacement of the pipe necessary every six months, causing expense for new pipe and lost time from production.

Then they switched to Koroseal rigid PVC pipe and, according to the plant superintendent, they expect it to be a "... permanent installation". The corrosion problems you have can also be solved by B. F. Goodrich high impact rigid Koroseal PVC pipe. In addition to handling corrosives safely, Koroseal pipe has the strength to take a beating.

Koroseal pipe is unaffected by most

acids and alkalis as well as oil, water, alcohol and salt solutions. Many solutions that eat away metal piping can be safely carried by Koroseal.

Easy to use with Koroseal fittings and valves, this rigid pipe can be threaded on any standard pipe threading equipment.

Koroseal pipe is available in various pressure schedules. Koroseal PVC comes in pipe, tubing, fittings, valves, rod, sheet and custom extrusions.

For full information on rigid Koroseal products fill in the handy coupon. Distributorships for certain areas are still

open. Inquiries invited. *B. F. Goodrich Industrial Products Company, Marietta, Ohio.*

**The B. F. Goodrich Company**  
Dept. K-86  
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Please send me free booklets on:

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## CORROSION CONTROL

**Caulking compound seals ducts, makes repairs to troughs carrying hot acid water . . .**

material also used to seal glass windows in metal frames on process units

A synthetic rubber caulking compound has been used to advantage in corrosive applications for more than four years by rayon plant.

One use of the caulking compound has been to seal glass windows in metal frames on processing machinery. Plant has found that in this application the compound stays firm but sufficiently plastic not to crack and cause leakage into the metal frames with consequent corrosion.

Material has also been used at the plant as a flange seal in ducts and — occasionally — to make temporary repairs in troughs carrying hot acid water. Plant's experience with the compound for all of these uses has been excellent.

The synthetic rubber caulking compound is a paste which cures without shrinking to a permanent, flexible solid synthetic rubber. Product consists of a base material and activator, packed in separate containers. After mixing, material can be applied by caulking gun, trowel, or knife. It bonds firmly to glass, brick, metal, concrete, wood, and transite.

(DEL caulking compound is product of David E. Long Corp., Dept. CP, 220 E. 42nd St., New York 17, N. Y. . . . or for more information check 7474 on form opposite last page.)



"How do you spell 'corrosion'?"

Drawn from idea by CP-reader Ben Luberoff.

When inquiring check 7473 opposite last page

(Continued from page 22)

### German exports — a bogey?

An old question, cropping up again recently, has been answered — at least, in part — by **Dr. W. Alexander Menne**, president of the Association of German Chemical Industries. Speaking to the annual conference of the MCA, stocky, assertive Dr. Menne said flatly, "Oft-heard allegations that Germany's chemical industry has regained its pre-war eminence just do not correspond to the facts."

Continued Menne, "Contrary to general impressions, the US has exported more chemicals to Germany than Germany has sold to America. In 1955, for example, US shipments to Germany totaled about \$65 million, while American companies bought only \$45 million from the Federal Republic."

"True enough," say American observers. But they are keeping a wary eye on chemical growth abroad. What they saw this summer: Electrochemische Kombinat Bitterfeld (formerly of I. G. Farben) soon to be producing a new PVC-type material; Buna-Werke, Dusseldorf, planning facilities for an annual 45,000 tons of cold rubber; in Ludwigshafen am Rhine, Badische takes a Phillips polyethylene license. And Dunlop, in London, is building a \$12 million, 50,000 long ton annual production synthetic rubber plant — Great Britain's first.

### Worried American sulfur producers

... are watching with growing apprehension the increasing stream of Mexican sulfur flowing into the US. Facing, for the first time in over fifty years, serious foreign competition, sulfur people are thinking that it's "pretty likely to continue its increase." Last year's figure was 31,000 tons. Best guesses for 1956 ... 150,000 long tons. Mexican companies are getting the price jump on them in two ways ... production and shipping. Forced, in many cases, to recover sulfur from py-

rites or ores, or from waste gases, the US producers are finding competition with the low-cost Frasch recovery process makes for pretty tough sledding.

And shipping rates are a thorn in the side of American companies recovering Mexican sulfur. Obligated to ship by the higher-priced American boats, US companies can easily be undersold by Mexican producers shipping in low-priced foreign vessels.

Sulfur men know it'll get worse before it gets better. The big question in sulfur circles is: how much worse?

### Post-form PVC

... it's now possible — without sacrificing PVC's advantages. Coming up with a new formulation that looks like the key to a new market, Chemical Division of General Tire has dubbed the polyvinyl Vygen 2201. It's a stock for calendering, but unlike most other calender stocks, it can be post-formed. And unlike nearly all others, it doesn't suffer flame or corrosion resistance because of it. (Details on page 28)

### Tonnage rocket fuel

... perennial prop of science fiction and "tomorrow's technology," is a palpable product of chemical makers right now. Stauffer, for example, at Niagara Falls, is hiking boron trichloride production to ten times present levels. This tricky chemical is one of the basics for high energy fuels (missiles, rockets).

What are the actual tonnages? Security conscious Stauffer officials won't say. Beyond "substantial tonnage," and "tankcar shipments after February 1957" even Stauffer stockholders are in the dark.

And Olin Mathieson has announced plans for a \$36 million plant to go up near Niagara Falls, producing high energy fuel for Air Force missiles and rockets. No capacity is indicated but the company has also revealed plans for a smaller operation turning out similar fuel for the Navy.

### Control instruments and chemicals

... are more than casually related. Spanking new chemical plants can tag something like 7 to 8% of their cost to instrumentation — though the average for all chemical plants is probably lower.

Somewhat self-satisfied with its own growth rate, chemical industry should see a trend in the rocketing growth of instrumentation. Pushed into being by wartime crash projects in Radar, aircraft and others, a good segment of the instrument business was still bush league in 1947 when the war ended.

But Government figures make it a \$2 billion business today ... and prognosticators like GE's **H. C. Dickinson** (who hit the \$2 billion figure on the button) see it hitting \$6 billion in 1965. Skeptical? Turn to page 66 ... these 350 new instruments were developed specifically for the chemical process industries in the one-year period ending last June 30.

### Tin: six more years

... at the present rate of consumption, will wipe out the known reserves within the confines of the Free World, says tall, confident **Bill Stolk**, president of American Can Company. Announcing Canco's plans to initiate a \$27 million program for construction of facilities to combat the looming tin shortage (as well as rising tin-plate prices from the steel suppliers), Stolk, with a right to be smug, told of plans that may "lead to a total revolution in container making." (Total world supply: 25 years)

### ACHEMA Congress for 1958

... to be held in Frankfurt am Main, will feature Nuclear Physics and Technology as well as such fields as lab technology, measurement and control, operational technique, pumps and fittings, and materials. Officials expect 10,000 visitors will come from all over the world to see 60,000 square meters of exhibits.



## Spotlight on People

## \$5 Million Worth of Research

Winding up another year of research (its 50th, though without any "Golden Jubilee" hooplah) Mellon Institute published its usual annual report. Packed in its fifty-odd pages: reports and interim reports on more than sixty research projects . . . representing an expenditure of more than \$5 million.

Typical of these reports: a 300-word write-up of physical property determinations of high molecular weight hydrocarbons. It cites three recent papers published in connection with work (one is available for the asking).

Other grab samples:

- **Rundown of "Separation and Purification Studies"** at Mellon this year mentions use of thermal diffusivity for separating organics, effects of packing densities, chromatography and selective adsorption, vapor-phase chromatography, and high-efficiency distillation.
- **Glass** — a chemical product for the past millenia and more — came in for its share of investigation. In one report a research group quite recently noticed "strong differences in silicon isotope  $Si^{29}$  nuclear resonance frequencies shown by complex silicate glasses, pure silica glass, quartz crystals, silicone oils.
- **Elastomers** and their real molecular weights came up for questioning. Fillers, physical specs, and orientation studies brought other phases of Mellon's work close to home for tiremakers and others.

Skimming report titles: Zirconium chemicals . . . "Useful Results from Research on Chemical Process Waste Waters" . . . Monomers from coal . . . Catalyst research . . . and others.

This illustrated report is available from Mellon Institute, Dept CB, 4400 Fifth Ave., Pittsburgh 13, Pa. . . . or check 7475 on form opposite last page.

**Robert W. Schramm** joins Union Carbide Development Co., with responsibilities for long-term corporate planning and evaluation of new business opportunities. And **W. H. Millett** is named sales manager, Ucon Products, for Carbide and Carbon Chemicals, assisted by **M. A. Bigelow**.

DuPont names **Dr. Charles J. Harrington** assistant director of sales for the company's elastomers division, succeeding **Oliver M. Hayden**, appointed special assistant to the director of sales.

Koppers establishes a plastics applications section and names **W. J. Fitzgerald** manager.

**Edward L. Shea**, president of the Ethyl Corporation since 1947, is named board chairman with **B. Bynum Turner** elected president.

**Dr. U. T. Greene**, coordinator of Diamond Alkali's commercial development department is named director of the chemical and rubber division, Business and Defense Services Administration, US Commerce Dept.

L.O.F. Glass Fibers Co. names **Herbert A. Fox** director of the future planning division.

And at Olin Mathieson . . . **John B. Seastone** is appointed director of the technical division while **G. D. Baerman** is named director of sales for the insecticide division.

Cyanamid elevates **Dr. William A. Raimond** to technical director of the company's organic chemicals division while **Dr. D. J. Salley** is named technical assistant to the general manager, research division. And in Cyanamid's new engineering and construction division, **T. P. Forbath** is named general manager, **Dr. J. F. Bourland** is technical director and **G. J. Forney** is manager of operations.

**Lester Ginsburg**, vice president of Electric Bond and Share Co., is named to the board of directors of Escambia Bay.

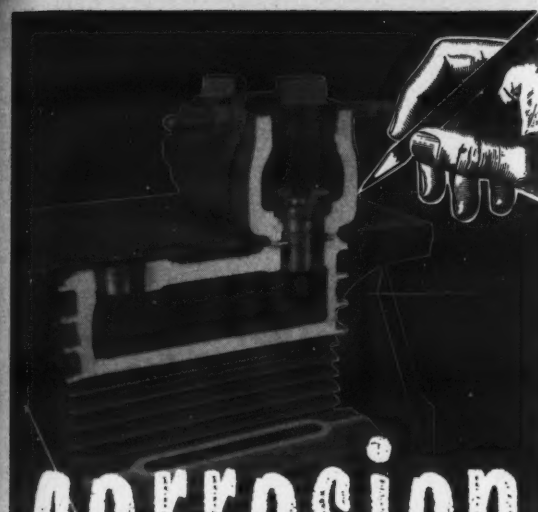
American Potash and Chemical announces that **Daniel S. Dinamoore** is named v-p in charge of planning and development while **Joseph C. Schumacher** is moved to vice-president in charge of research.

Realigning organizational functions, Davison Chemical division of The Grace Company names **F. C. Nicholson**, **David N. Hauseman**, and **W. N. Watmough Jr.**, v-p and general managers of chemicals, agricultural chemicals and mixed fertilizer divisions, respectively.

Monsanto appoints **Dr. Thomas Hurst** assistant director of research for the company's inorganic chemicals division, **George R. Buchanan Jr.** is new associate manager of petroleum chemicals sales for the organic chemicals division, while **Thoburn P. Sands** and **William B. Hicks** are appointed section managers in the organic chemicals division's development department.

And at Monsanto's Shawinigan Resins . . . **Peter W. Blaylock**, v-p of Shawinigan Chemicals Ltd., and **J. Russell Wilson**, Monsanto v-p, are named board members.

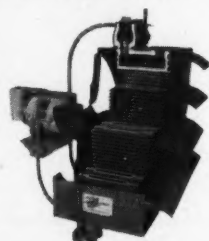
Allied's Solvay Process Division names **James F. Adams Jr.** general manager of technical service with **Norman C. Weil** appointed technical advisor. And **Wilbur L. Epting Jr.** is manager of Solvay's Brunswick, Ga., chlorine-caustic plant, assisted by **Bruce T. Smith**.



# CORROSION

EXTERNAL — from contaminated air  
INTERNAL — from electrolytic action

# ends



When your unit heaters are  
GRID cast iron construction.  
Here's why—

GRID heating sections and headers are made of high-test cast iron . . . *no external corrosion from acid fumes.* All metals in contact with steam are similar . . . *no electrolytic action internally . . . no internal corrosion.* GRID construction ends your unit heater maintenance problems — because GRID will operate on steam pressures up to 250 P.S.I. . . 450° temperature . . . no pressure-reducing valves needed. No soldered, brazed, welded or expanded connections . . . a specially designed threaded nipple provides a leak proof joint (see illustration).

GRID design gives you maximum heating performance because — GRID provides more air changes at lower outlet temperature . . . carefully selected motor speeds and fan capacities positively deliver warm, comfortable air in ample volume to floor level . . . no wasted heat through stratification.

GRID installations save you money as GRID requires no maintenance . . . is practically self-cleaning (note wide fin spacing in illustration). GRID provides long service life . . . units installed in 1929 are still operating. No ordinary unit heater approaches GRID's record for continuous trouble-free heating service.

Get the complete story on  
GRID Unit Heaters,  
GRID Blast Heaters and  
GRID Radiation for chemical  
plant use. Write for  
your copy today!



**D. J. MURRAY  
MANUFACTURING CO.**

MANUFACTURERS SINCE 1883

WAUSAU, WISCONSIN

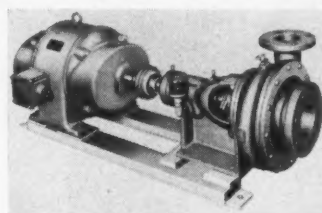
When inquiring check 7476 opposite last page

## CORROSION

Severe conditions withstood  
by centrifugal pumps  
of Illium G alloy . . .

capacities to 600 gph available

Series of centrifugal pumps constructed of Illium G alloy for unusually severe corrosive service are available. Pumps can be furnished in sizes from fractional flow to units having capacity of 600 gpm at 150 ft head.



For highly corrosive slurries and  
solutions

Material used for pumps, Illium G, is a nickel-chromium-molybdenum alloy having 91.4% of its composition of corrosion-resistant alloying constituents. Only 6½ to 7½% iron is present. As corrosive media become more severe, stainless steels must be richer in nickel, chromium, and molybdenum to provide satisfactory service.

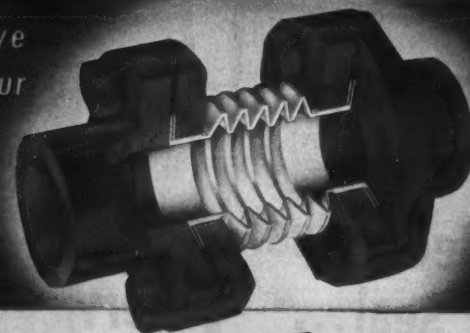
(Illium G centrifugal pumps are a product of Ampco Metal, Inc., Dept. CP, 1745 South 38th St., Milwaukee 46, Wisconsin . . . or check 7477 opposite last page.)

(Illium G alloy is product of Stainless Foundry & Engineering, Inc., Dept. CP, 5134 N. 35th Street, Milwaukee 9, Wis. . . . or check 7478 on form opposite last page.)

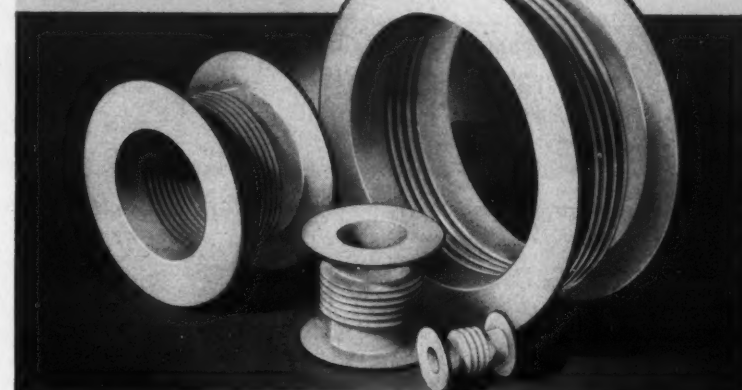
### Data on protective tapes

Variety of protective tapes that have been successful in providing protection to piping below and above ground as well as to other equipment are described in 25-page bulletin. Bul PC5-9 is issued by Polyken Sales Div., The Kendall Co., Dept. CP, 222 W. Adams St., Chicago 6, Ill. When inquiring specify 7479 opposite last page.

You can solve  
many of your  
difficult  
piping  
problems  
with



**JOHN CRANE**  
**CHEMICALLY INERT  
BELLOWS** MADE OF TEFLON\*



- 1 Chemically inert  
—will handle all corrosive liquids, petroleum products, gases and solvents.
- 2 Life-long flexibility  
—will not damage or fatigue under severe vibration or repeated expansion and contraction.
- 3 Outstanding electro-chemical properties  
—eliminate electrolysis in the handling of chemicals, acids, etc.
- 4 Wide temperature range  
—flex perfectly over a wide temperature range.

"John Crane" Bellows are a positive answer in the transmission of "hard-to-handle" liquids and gases . . . including the most destructive corrosives . . . at temperatures from -300°F. to +500°F. Typical applications are vibration dampeners, expansion joints and connectors for misaligned couplings.

Made from a special densely molded stock and so machined that there is no inherent stress of their free length — they expand and contract with equal freedom of motion. End flanges of French-type gasket construction facilitate easy assembly and assure a leak-proof seal. Available in a full range of standard pipe dimensions from ½ to 12 in.

Bellows are also available in a wide range of designs for metering pumps, pressure accumulators, batching scale connectors, etc.

Further information on Teflon parts and products is available in "John Crane's" 12-page illustrated catalog, "The Best in Teflon." Send now for your free copy. Crane Packing Company, 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

\*DuPont trademark

**JOHN CRANE**  
**CRANE PACKING COMPANY**

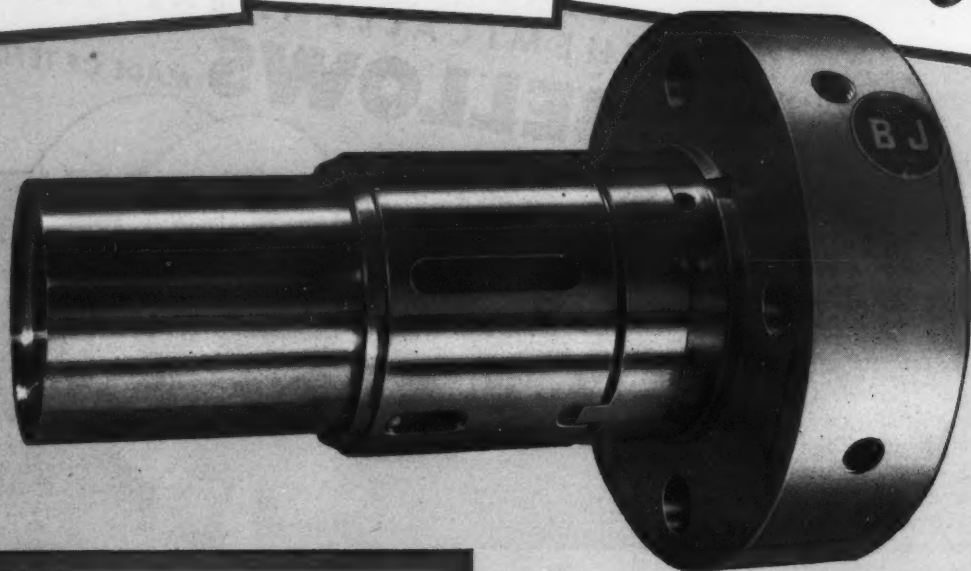
When inquiring check 7480 opposite last page



This **ONE**  
BJ  
Mechanical  
Seal...

Answers  
**THREE**  
Pumping  
Services...

With only  
the change  
of  
**GASKETS!**



**1**

#### HIGH OR LOW TEMPERATURES

The BJ **ASBESTOS** GASKETS handle temperatures from minus 100°F to plus 650°F.

**2**

#### CORROSIVE

The BJ **TEFLON** GASKETS answer a wide range of corrosive fluids.

**3**

#### HIGH PRESSURE

The BJ **RUBBER** GASKETS handle pressures to 1000 PSI... and any general service needs.

This one basic Byron Jackson Type U Mechanical Seal solves *three* major pumping services with only the change of two gaskets. You benefit because: (a) you can *standardize* on this basic BJ Type U Seal and thus greatly reduce your parts and inventory needs; (b) you can convert process pumps to changes of service with only the change of two gaskets; and (c) you *eliminate* costly, troublesome stuffingbox repacking and unnecessary pump downtime.

Only Byron Jackson... the leader in Mechanical Seals... offers this simplified interchangeability of service through a change of gaskets.

If your operations involve multiple pumps with variations in service requirements, look into this basic BJ Type U Seal. If your pumping needs are more highly specialized in any one field, there's a BJ Mechanical Seal engineered to solve almost every stuffingbox requirement.

**FREE MECHANICAL SEAL SELECTION PORTFOLIO**—Send for this special Byron Jackson Mechanical Seal Selection Portfolio. Includes size, material, price and installation information. Write today to:



**Byron Jackson Pumps**  
INC.

**BJ**

A Subsidiary of Borg-Warner Corporation  
P.O. Box 2017A, Terminal Annex  
Los Angeles 54, California

When inquiring check 7481 opposite last page

## CORROSION CONTROL

**Coatings produced by spraying non-metallic powders through flame gun...**

crystalline oxide coatings resist chemicals, heat, and abrasion

**Uses:** Coatings can be applied to most metals, glass, carbon, and refractories.

**Features:** Coatings have excellent resistance to heat, abrasion, and chemical attack.

**Description:** Process developed by Armour Research Foundation of Illinois Institute of Technology consists of producing coatings by spraying non-metallic powders through a flame gun on an otherwise unheated surface. Coatings are generally crystalline oxides or oxide mixtures. Number of coatings are available, including such materials as stabilized zirconium oxide or aluminum oxide. One particular coating resists wetting by most molten metals, while others are so heat resistant that the underlying supporting metal can be melted without damage to the coating.

(Coating process is licensed to Continental Coatings Corp., Dept. CP, 140 S. Dearborn St., Chicago, Ill. . . . or for more information check 7482 on form opposite last page.)

**Made from rubber and resin, tank liner is unaffected by petroleum products...**

material can be applied from an emulsion, eliminating toxic solvents

**Uses:** Product has been thoroughly tested and found to be satisfactory for use as a liner for storage tanks handling petroleum products. It may also be suitable for other similar applications.

**Features:** Lining retains its adhesion and flexibility even though immersed in gasoline.

**Description:** Tank lining is a combination of a tough and elastic synthetic rubber and a hard resin blended in such a manner as to yield a coating which has excellent adhesion to metal or concrete. Films can be applied from an emulsion, eliminating toxic solvents and fire hazard during application.

(Tanktite liner is product of The H. B. Davis Co., Dept. CP, Bush & Severn St., Baltimore 30, Md. . . . or for more information check 7483 on form opposite last page.)

For more information on product advertised at right, specify 7484 . . . see information request blank opposite last page. ➡



## Meet three synthetic detergent experts

You're looking at a Philadelphia installation of The Atlantic Refining Company (expert #1).

Ultrawet, an important ingredient of synthetic detergents, is the product being processed in this modern plant designed and built by The H. K. Ferguson Co. (expert #2).

Helping to prevent contamination of the product due to corrosion are long-lasting, red-wheeled valves made by Aloyco (expert #3). Made of corrosion-resistant Aloyco 20,

the gate and globe valves used here handle a 98% concentration of sulfuric acid at up to 180° F.

Whatever your process, whichever corrosives you need to keep in line, it pays to check first with Aloyco. As the world's largest manufacturer of corrosion-resistant valves exclusively, we're most likely to have the valve you need. Write Alloy Steel Products Company, Inc., 1301 West Elizabeth Ave., Linden, New Jersey.

63



Subsidiary of Walworth Company





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**RUSSELL L. PUTMAN**  
**Publisher**

## The men who edit Chemical Processing...

### *A unique editorial philosophy guides Chemical Processing—*

- ... *readability of content* is fully as important as the editorial content itself. *Unless an article is read, it serves no one.*
- ... *to build maximum readership, of the busy men who manage*, editors must first *take the work out of reading.*
- ... articles must be terse, to-the-point, vital, pertinent to the *job-interests* of readers, adequate in information.
- ... headlines must *inform* quickly what each article is about . . . no vague or "tricky," misleading heads to waste readers' time.

From more than 30 years publishing experience, Publisher Putman designs the editorial pattern. The staff of technical editors fits the vital editorial content into this pattern.



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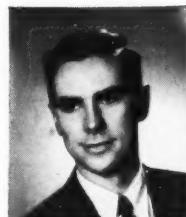
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**FOOD PROCESSING**  
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**INDUSTRY POWER**

*"Executive Magazines For Industry"*

**Film thicknesses of 50-60 mils  
in one coat can be formed  
with sprayable plastisol . . .**

gives "sheet" protection to tanks, ducts, other large equipment

**Uses:** For protection of tanks, ducts, and other equipment from corrosion.

**Features:** Film thicknesses of 50-60 mils per spray coat can be formed with the newly formulated sprayable plastisol.



This 50-60 mil coat was obtained with one spray application

**Description:** Coating makes possible gun application of full solids content of vinyl plastisol without a diluent. As a result, a pore-free 50- to 60-mil coat can be successfully applied in one layer to give "sheet" protection to tanks, ducts, and other equipment. Coating resists strong acids, concentrated caustic, and other chemicals. Coating withstands abrasion and absorbs impact without chipping. It is satiny smooth in appearance.

(Unichrome Super 5300 plastisol coating is product of Metal & Thermit Corp., Dept. CP, 100 Park Ave., New York 17, N.Y. . . . or for more information check 7485 on form which is located opposite last page.)

#### **Wear-resistant beryllium copper casting alloys**

Ten-page publication describes casting alloys made from beryllium copper, which contain 2% beryllium and 98% copper. Alloy described has good resistance to corrosion and wear. It has strength and good electrical conductivity. Combination of strength, hardness, conductivity, and corrosion resistance make it a valuable alloy for many applications.

"Berylco Beryllium Copper Casting Alloys" is issued by The Beryllium Corp., Dept. CP, Reading, Pa. When inquiring specify 7486 on form opposite last page.



**Have safer lines with  
less maintenance . . .**

**INSTALL**

**LAPP TUFCLAD®**

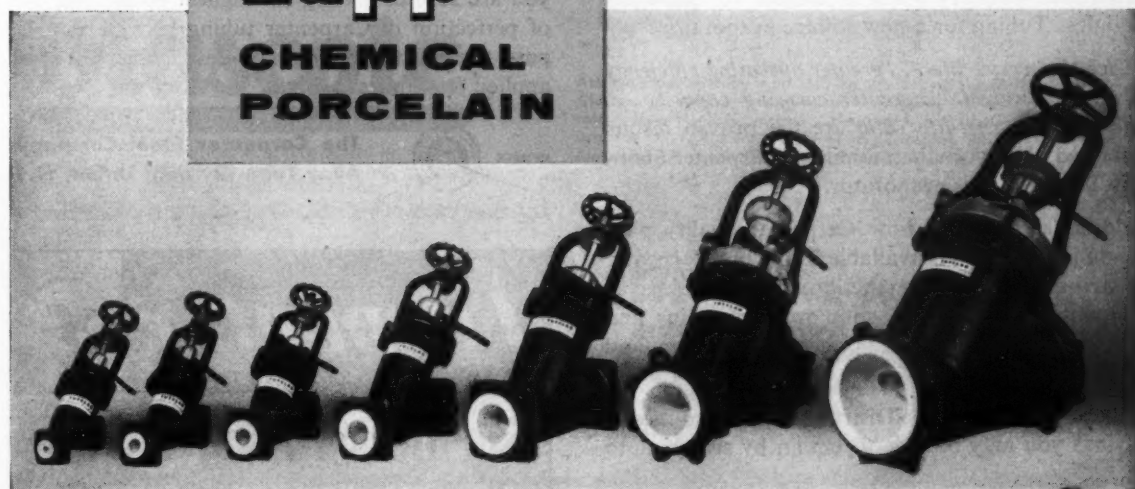
**SOLID CHEMICAL PORCELAIN ARMORED  
WITH FIBERGLASS-REINFORCED PLASTIC**

The extra margin of safety essential to many process plants where protection of personnel, equipment and product is vital is assured by the bonding of TUFCLAD fiberglass-reinforced plastic to Lapp Chemical Porcelain. Strong fiberglass fabric is impregnated and bonded in multiple layers to the porcelain with an Epoxy resin of high strength and chemical resistance. It cushions accidental blows—acts as an insulator against thermal shock—and because TUFCLAD is so strong and tough, it will hold operating pressures even when porcelain is damaged by accident. Specify Lapp TUFCLAD Chemical Porcelain and enjoy the purity and corrosion resistance of a solid porcelain system with extra security from TUFCLAD armor.

Y-Valves, as shown, and Angle Valves are available in Lapp TUFCLAD Chemical Porcelain in ½", 1", 1½", 2", 3", 4" and 6" sizes. Also safety valves, flush valves, plug cocks, pipe and fittings (to 8" diameter) and special shapes.

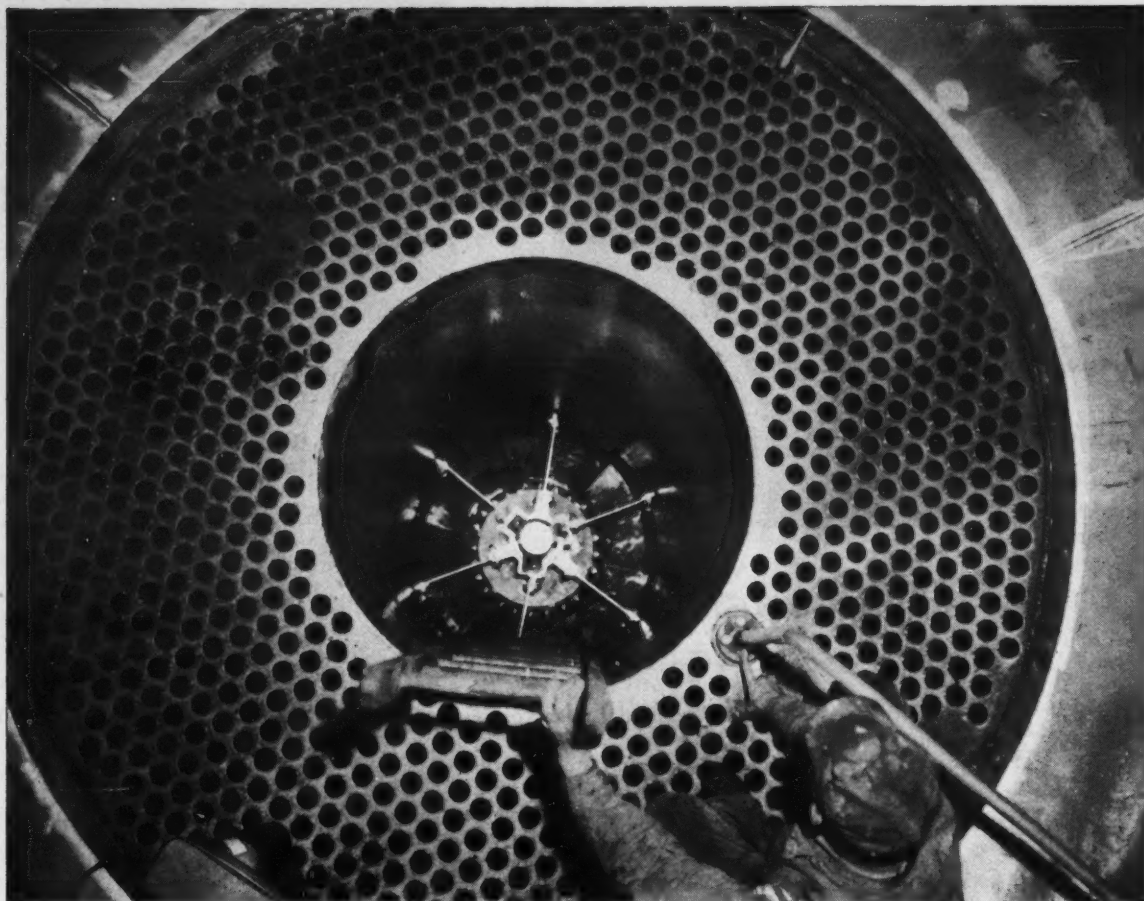
**Lapp**  
**CHEMICAL**  
**PORCELAIN**

*WRITE for description and specifications.  
Lapp Insulator Co., Inc., Process Equipment  
Division, 819 Wendell St., Le Roy, N. Y.*



When inquiring check 7487 opposite last page





## Switching to *Carpenter* Stainless Tubing pays off 5 ways!

How can you use the five advantages gained by a prominent distillery when it changed to Carpenter Stainless Tubing for a new stillage evaporator?

*Twice the service life . . . greater operating efficiency . . . lighter weight . . . greater carrying capacity . . . and a higher cost-life ratio* are the proven results obtained with more than a mile of Carpenter Stainless Tubing in this evaporator.

Additional proof of how Carpenter quality pays off on job after job is available from your Carpenter Distributor. Discover the profitable difference Carpenter can make on your own processing and transfer lines, evaporators, heat exchangers and similar applications.

Talk to your Carpenter Distributor now about cost-savings you may be able to obtain by switching to

Carpenter Stainless Tubing or Pipe. Remember, you are sure of getting the highest possible degree of perfection in Carpenter tubing because it must pass the most exacting non-destructive test ever applied to stainless tubing.



**The Carpenter Steel Company,  
Alloy Tube Division, Union, N.J.**

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"



When inquiring check 7488 opposite last page

## CORROSION CONTROL

### Teflon-lined pipe handles variety of corrosives

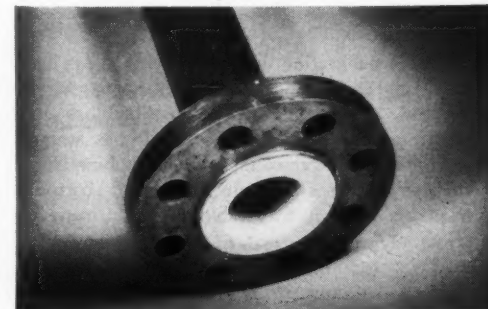
Teflon bonded to pipe with thixotropic, one-component epoxy paste

Teflon-lined pipe, which makes available the excellent corrosion resistance of Teflon plus the strength of a metal pipe, is manufactured with the aid of a thixotropic, one-component epoxy paste which is used as a bonding agent. This bonding agent makes the Teflon adhere firmly to the metal pipe.



Epoxy bonding agent can be easily applied with a spatula prior to insertion of Teflon liner in pipe

By eliminating the mixing of a separate resin and hardener, the single-component formulation of the bonding agent simplifies joining of plastics to metals. It can also be used to bond metals to metals. Product is based upon Ciba Araldite AN-100. In addition to being a single-component system, adhesive is thixotropic. Just as is true with the recently developed thixotropic paints, drip or run is eliminated. Material is easily spread with a brush or spatula to thickness desired.



Teflon-lined pipe has excellent corrosion resistance and strength

CHEMICAL PROCESSING

(Teflon-lined pipe is product of Ethylene Chemical Corp., Dept. CP, 245 Broad St., Summit, N.J. . . or for more information check 7489 on form opposite last page.)

(Bondmaster M620 epoxy adhesive is product of Rubber and Asbestos Corp., Dept. CP, 225 Belleville Ave., Bloomfield, N. J. . . or check 7490 on form opposite last page.)

#### Corrosion-resistant floor topping trowels on 1/8" thick

**Uses:** For chemical processing plants and installations having severe floor-corrosion problems.

**Features:** A 1/8" thickness of the material troweled over concrete hardens quickly to give a dense, hard-wearing floor surface that is easy to clean and is non-reactive to chemical reagents.

**Description:** Material is composed of a chemically inert aggregate and a catalyst-hardened inorganic plastic binder. Tests show that the topping is not decomposed by such corrosives as concentrated hydrochloric, nitric, and acetic acids, either through spillage or total immersion. It also resists fatty acids, brine, animal and vegetable oils, and strong cleaning caustics. Topping comes in different colors.

(Chem-Top floor-topping is product of The Garland Co., Dept. CP, 3748 E. 91st St., Cleveland 5, Ohio . . . or for more information check 7491 on form opposite last page.)

#### Corrosion-resistant roller chain has low friction coefficient . . .

resists salt spray, beer, bleach, acetic, nitric, and sulfuric acid

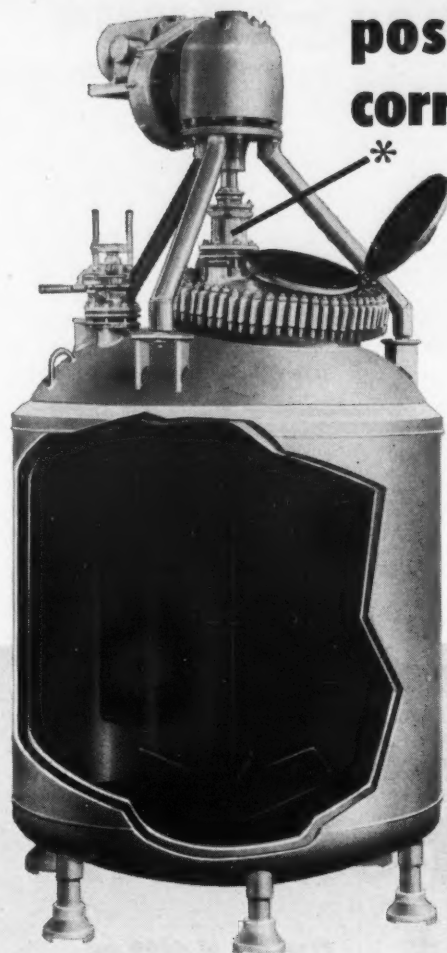
**Uses:** To meet performance requirements in the chemical, petroleum, brewing, pharmaceutical, and other industries where corrosion resistance is an important factor in roller chain.

**Features:** Chain is stainproof and corrosion resistant. It successfully withstands beer, bleaching powder, citric acid, hydrogen peroxide, salt spray, acetic, nitric, and sulfuric acid.

**Description:** Electrolyzing process used on chain increases surface hardness, lowers coefficient of friction, and relieves the residual stresses. In most cases an alloy steel is used as the base metal.

(Electrolyzed roller chain is product of the Atlas Chain and Manufacturing Co., Dept. CP, West Pittston, Pa. . . or for more information check 7492 on the convenient Reader Service slip which is located opposite last page.)

## Glascote glass-lined reactors give you more years of positive protection against corrosion and contamination



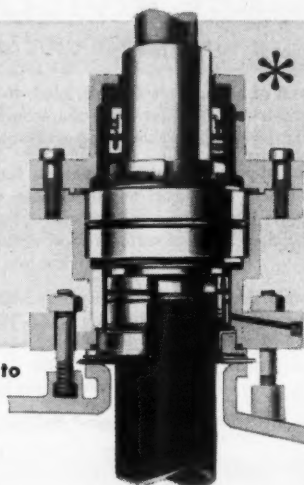
• In corrosive processes, you'll find Glascote's glass-lined heavy-duty reactors provide extra years of productive, trouble-free service. And product purity is assured — ever free of metallic contamination because Glascote's highly chemical-resistant, acid-alkali glass offers great versatility of products to be processed. Glascote also gives you non-stick glass for polymer production, such as polyvinyl chloride, polyvinyl acetate and synthetic rubber. (Glass-lined storage vessels are also offered for both types of processing.)

Glascote can meet your specifications for large, heavy-duty reactors. Complete line is equipped with exclusive leak-proof mechanical seal, agitator and baffle . . . in capacities up to 4000 gallons and larger. Internal and jacket pressures to meet your specifications.

#### \* Exclusive rotary mechanical seal

Glascote's exclusive rotary, mechanical seal design provides two major advantages to users of glass-lined equipment requiring either high pressure or vacuum. (1) Eliminates leakage under pressure (toxic or explosive conditions), and reduces maintenance. (2) Permits efficient use of higher operating pressures and prevents contamination of vessel contents.

Outstanding features include glass-coated gland insert, glass-coated agitator shaft, and Teflon packing.



Our standard one year guarantee continues to apply to all Glascote glass-lined products.

# Glascote®

PRODUCTS, INC.

Sales offices or agents located in  
New York • Philadelphia • Union, N. J. • Chicago • Cleveland  
Dayton • Houston • Los Angeles  
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Milwaukee 1, Wis.

Ask the representative who calls on you for all the facts about Glascote products — reactors, storage tanks, columns, conical rotary dryer-blenders, receivers, condensers and accessory products. Or, if you prefer, write direct. Glascote Products, Inc., Cleveland 17, a subsidiary of A. O. Smith Corporation.

## A subsidiary of A.O. Smith Corporation

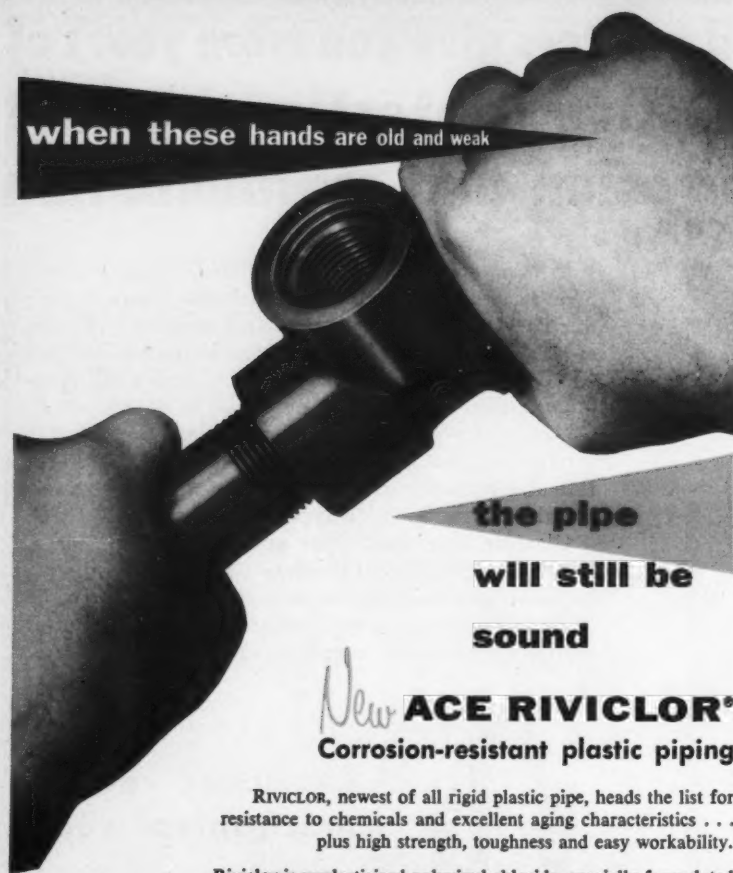
World's largest manufacturer of glass-lined steel products



When inquiring check 7493 opposite last page



when these hands are old and weak



## New ACE RIVICLOR® Corrosion-resistant plastic piping

RIVICLOR, newest of all rigid plastic pipe, heads the list for resistance to chemicals and excellent aging characteristics . . . plus high strength, toughness and easy workability.

Riviclор is unplasticized polyvinyl chloride, specially formulated for process piping. Non-toxic, non-flammable, excellent insulating properties. Only half weight of aluminum. Never needs painting. Smooth inner surfaces give you high flow rates with low loss of head.

Approved  
For Use  
With  
Drinking  
Water



Use Riviclор for all in-plant piping of mild or strong corrosives at normal temperatures . . . for liquid lines where "sweating" or corrosive vapors are problems . . . for underground piping. Pipe, fittings, diaphragm valves from 1/2" to 2".

Ask for Technical Bulletin CE-56.

### ABBREVIATED TABLE OF CHEMICAL RESISTANCE

ACIDS		BASES		MISCELLANEOUS		Carbon	
Acetic 50%	S	Ammonium		Ethyl Alcohol	S	Tetrachloride	S
Chromic 25%	S	Hydroxide 28%	S	Methyl Ethyl		Plating Solutions	S
Hydrochloric		Sodium		Ketone	U	Photographic	
38%	S	Hydroxide 50%	S	Gasoline	S	Solutions	S
Hydrofluoric		HALOGENS		Mineral Oil	S		
50%	L	Sodium		Animal Oil	S	KEY: S—Satisfactory	
Nitric 20%	S	Chloride Sat.	S	Vegetable Oil	S	L—Limited to	
Sulphuric 50%	S	Ferric Chloride	S	Phenol 10%	S	certain	
Sulphuric 98%	S	Sodium Hypo-		Chlorine 5%	L	applications	
		chlorite 5%	S	Alum	S	U—Unsuitable	

**ACE** processing equipment of rubber and plastics

**AMERICAN HARD RUBBER COMPANY**  
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 7494 opposite last page

## CORROSION

### Treatment of Teflon permits bonding . . .

opens many new applications  
for product

**Uses:** Suggested applications include lining or covering chutes, rolls, tanks, pipes, ducts; facings for valves, machined parts, and many other similar uses.

**Features:** Process alters the surface of Teflon to make possible permanent bonding to a variety of materials with conventional commercial adhesives.

**Description:** Excellent anti-sticking characteristic of Teflon has made it valuable for many applications but this same important property has limited it in other applications where it is desired to adhere Teflon to itself or other materials. This problem can now be overcome by Teflon sheets and tapes which are treated for bonding purposes.

(Bondable Teflon is product of Flexrock Co., Dept. CP, 3611 Filbert St., Philadelphia 1, Pa. . . . or for more information check 7495 on form located opposite last page.)

### Pressures of 4000 psi at 650°F suitable for valve . . .

stainless unit is designed for  
nuclear uses

**Uses:** Valve is designed specifically for nuclear applications. It is also suitable for chemical operations requiring high pressures and temperatures.

**Features:** Valve is suitable for pressure of 4000 psi at 650°F.

**Description:** Valve body is the self-draining type. After assembly, unit is completely sealed by a lip weld. It is available in sizes from 1/2 to 1 1/2".

(Series 1246W Valves are product of Associated Valve & Engineering Co., Dept. CP, 1150 West Marquette Road, Chicago 21, Illinois. Check 7496 opposite last page.)

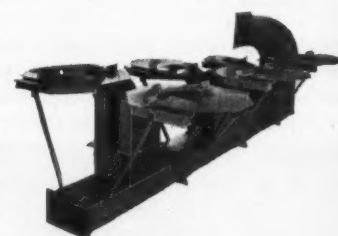


**OLD METHOD**—To exhaust fumes from their plating department, a bearing manufacturer used metal coated ducts. Corrosion destroyed them in eight months.

**NEW METHOD**—Van-Cor Ducts shown above have already served three years—four times longer—and are as good as new!

An unplasticized polyvinyl chloride, Van-Cor has licked scores of corrosion problems. Van-Cor is fabricated into ducts, hoods, chemical tanks, stacks, etc. Also available in pipe, fittings and valves. Both Chemically Resistant and Impact Resistant types. Van-Cor has only half the weight of aluminum, yet has high tensile strength.

*Intricate Van-Cor hood and duct for exhausting acid fumes while reclaiming precious metals. Previous duct materials were replaced every two months. This Van-Cor fabrication is over two years old.*



### INVESTIGATE!

Write for Bulletin, Specifications and Name of  
Nearest Distributor.

INDUSTRIAL DIVISION OF  
**COLONIAL PLASTICS MFG. CO.**

**SUBSIDIARY OF THE VAN DORN IRON WORKS CO.**  
2685 EAST 79th STREET • CLEVELAND 4, OHIO

When inquiring check 7497 opposite last page

CHEMICAL PROCESSING

**Mist eliminator made from Monel lasts three times longer than standard units . . .**

maintains practically 100% removal efficiency over wide range of velocities

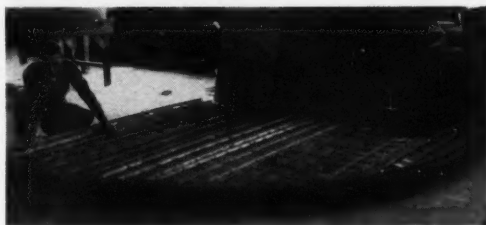
**Uses:** Mist eliminators made from Monel wire have been found extremely durable in caustic soda evaporators and when exposed to hydrogen sulfide in refinery gases below 500°F. Eliminators are used in a variety of other equipment in chemical plants and in petroleum refineries where droplets of sulfuric acid may be entrained.



Entrainment separator is knitted from Monel alloy wire. Herringboned fold increases area available for impingement

**Features:** In one installation, the mist eliminator lasted three times longer under coking conditions than standard mesh units. Unit maintains practically 100% removal efficiency over a wide range of operating velocities.

Eliminator has one-half to one-third pressure drop of former units and also purges itself more readily.



One quadrant of a 15'-diameter mist eliminator being assembled from a number of strip sections. Grids have already been attached

**Description:** Entrainment separator is knitted from Monel wire. After herring-boning, wires of mesh touch only on the top of crimps in each ply.

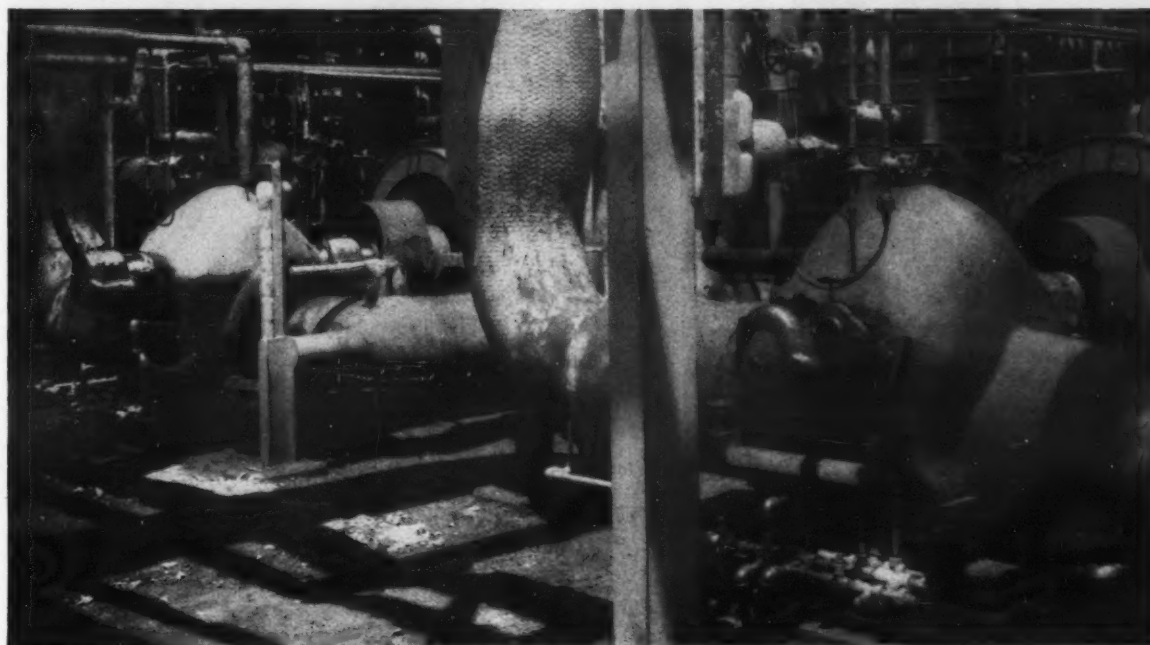
Amount of wire surface which is free and usable for impingement is increased, since fewer wires are blocked out of service by being compressed against other wires.

(Mist eliminator is product of Metal Textile Corp., Dept. CP, Roselle, N.J. . . . or for more information about manufacturer's product, reader may simply check 7498 on the convenient Reader Service slip opposite last page.)

(Monel is product of The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. . . . or for more information check 7499 on the convenient Reader Service slip which is located opposite last page.)

## Allis-Chalmers

# PUMPS Solve a Chemical Industry Problem



## All-Stainless-Steel Pumps Handle Hot Corrosive Liquids

Manufactured on duty-specifications from the customer, these Allis-Chalmers Type SG stainless steel pumps are successfully handling a highly corrosive mixture of carbonate, urea, oil, and water at 260 F.

This is another example of the way Allis-Chalmers serves the chemical industry with a wide range of types of pumps in all sizes. These versatile, high efficiency Allis-Chalmers pumps are available in many special materials to meet specific application requirements.

**For full information** on how Allis-Chalmers can help you reduce costs, contact your local Allis-Chalmers district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



A-4983

# ALLIS-CHALMERS

When inquiring check 7500 opposite last page

**You Get MORE when you Get ALLIS-CHALMERS**

**You can benefit** from Allis-Chalmers years of experience in pump manufacturing for all industries. The design and engineering skill resulting from this experience is at your service — you get special construction pumps that give top performance and low operating costs.

Allis-Chalmers industry-experienced engineers will help you select exactly the Allis-Chalmers pump to meet your needs, and Allis-Chalmers can furnish a complete pump unit—pump, motor, and control.



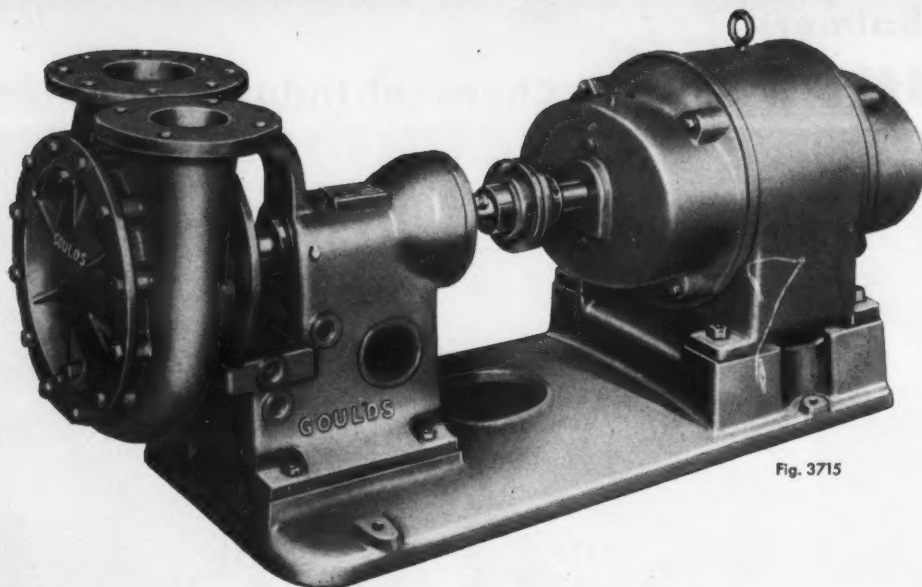


Fig. 3715

## Here's a pump especially designed for your **ABRASIVE** and **CORROSIVE** liquids

You minimize your "hot" pumping problems — and expenses — with Goulds chemical pumps because *they're built to take it!*

With the Fig. 3715 pump, you can handle liquids that would "murder" most pumps. Such liquids as acid, alkaline liquor, hot size, and slurry. But this pump offers more than just severe service design. You get fewer maintenance problems plus special operating advantages.

Look at the support head—it's rugged, box-type design with water jacket permits you to pump liquids as hot as 350° F. Over-lubrication is prevented by grease-lubricated standard bearings with grease relief. You can adjust impeller clearance without any dismantling by means of a simple, positive external arrangement.

A variety of construction materials meets every need. Goulds Fig. 3715 pumps come in Type 316 and Gould-A-Loy 20 stainless steel, all aluminum-bronze, all iron or bronze-fitted.

There's a wide range of sizes, too—nine in all—with capacities up to 720 GPM and heads to 200 feet. You can keep a low spare parts inventory since many of the parts are standardized for interchangeability between sizes.

There are many more reasons why you can save money and avoid maintenance headaches by pumping those harsh liquids with a Goulds Fig. 3715 pump. Learn about them by addressing your inquiry to Goulds Pumps, Inc., Seneca Falls, N. Y.

Ask for Bulletin 725.4.

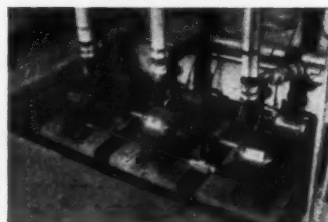


ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK  
PHILADELPHIA • PITTSBURGH • TULSA

When inquiring check 7501 opposite last page



Here is a Goulds pump handling hot fatty acids in an oil processing plant.



Here are three Goulds chemical pumps circulating hot size in a textile plant.



Goulds stainless steel pump handles corn meal mush in a food plant.

## CORROSION CONTROL

**HCl and H<sub>2</sub>SO<sub>4</sub>, successfully handled by plastic pipe and fittings at battery plant . . .**

two plastics have been in service over a year, former piping lasted only one month

**Problem:** Metal pipe and pipe fittings used on hydrochloric acid lines to zinc plating tanks at Globe-Union, Inc., Milwaukee, Wis., had to be completely replaced about once a month. In battery test tanks, where sulfuric acid concentration builds up, metal set up electrolytic action. Resultant corrosion caused piping to fail in a short time.

**Solution:** Early in 1955 Globe installed polyethylene plastic piping and polystyrene fittings on these two troublesome spots. Only equipment needed to install plastic material was a knife and a screw driver.



Zinc plating baths at Globe-Union. Former piping needed replacement every month, present piping has been in service over a year

**Results:** Lines for both hydrochloric and sulfuric acid have been in service for over a year with no sign of deterioration, no apparent need for replacement.

In addition to savings in replacement costs, reduction in labor costs to install piping has also been substantial. What was formerly a job for two pipe-fitters is now an easy, quick, one-man job.

Results of these test installations have been so successful that Globe-Union is now making plastic piping the standard for similar applications in many of its twenty-two plants.

(Polyethylene pipe and polystyrene fittings are products of Crane Co., Dept. CP, 836 S. Michigan Ave., Chicago 5, Ill. . . or for more information check 7502 on form opposite last page.)

**Corrosion-resistant styrene plastic  
adopted for liquid ends  
of pumps . . .**

controlled-volume units can handle up to 70 gph of chemical at 150 psi and 160°F

**Uses:** For low-pressure, moderate-temperature pumping applications where corrosives are being handled.

**Features:** Plastic material now being used for liquid ends of pumps has excellent corrosion resistance.



Controlled-volume pump fitted with corrosion-resistant plastic liquid ends

**Description:** High impact, modified styrene resin compound, known as Plio-Tuf, is being used for liquid ends of controlled-volume pumps. This plastic can be molded and does not have to be extensively machined. It can be used on pumps with plunger diameters up through 1 1/8". Recommended ranges for these recently developed liquid ends are 150 psi, 160°F, at maximum capacity of 70 gph.

(Controlled-volume pumps are a product of Milton Roy Co., Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pa. . . or for more information check 7503 on form opposite last page.)

(Plio-Tuf resin compound is product of the Goodyear Tire & Rubber Co., Dept. CP, Akron, Ohio . . . or check 7504 on the convenient Reader Service slip which is located opposite last page.)

Yes . . .

**CHEMICAL PROCESSING**

is "different!"

There are good reasons why!

See letter from the Editors, page 100.

**TAKE A TIP FROM**



**ON HANDLING TOUGH CORROSIVES!**

**USE CHIKSAN  
LOADING ARMS**

FOR CATALOG, WRITE DEPARTMENT 13-7

To maintain smooth production schedules, Eastman Kodak brings corrosive solvents and acids to its Rochester plant via truck from nearby tank farm storage. Corrosive action, however, was destroying loading hoses after comparatively short periods of use. To overcome this costly problem Kodak replaced its hoses with Chiksan Loading Arms. That was 10 years ago. Today, there are over 40 Chiksan Loading Arms in service at Kodak Park and not one record of product fatigue to date.

Whatever your fluid handling requirements, be it corrosive or other, insist on Chiksan Loading Arms—the time proven answer where the accent is on service, safety and speed.

There's a Chiksan Catalog waiting for you. Send for it today.



A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION



CHIKSAN COMPANY—BREA, CALIFORNIA • CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Subsidiaries: Chiksan Export Company • Chiksan of Canada, Ltd.

When inquiring check 7505 opposite last page

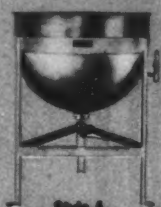


# LEE

*Corrosion-Resistant*

## PROCESSING EQUIPMENT

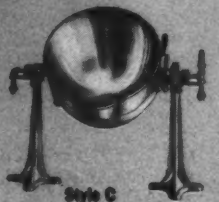
PRECISION BUILT OF STAINLESS STEEL  
TO YOUR SPECIFIC REQUIREMENTS



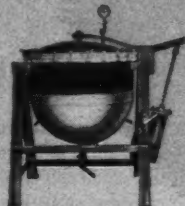
Style A  
Two-thirds Jacketed  
5 to 500 gal.



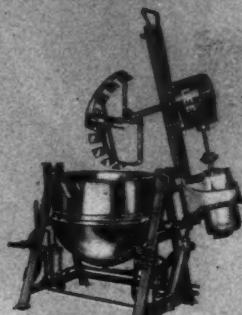
Style B  
Full Jacketed  
10 to 300 gal.



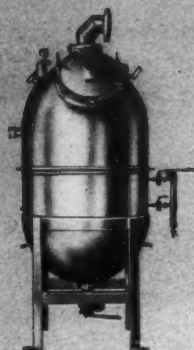
Style C  
Two-thirds Jacketed  
5 to 100 gal.



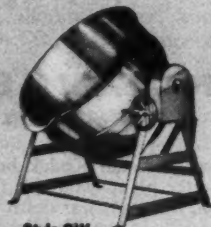
Pressure Kettle  
Two-thirds Jacketed  
40 to 200 gal.



CWST  
Center-line Scraper  
Agitator Kettle—80 to 300 gal.



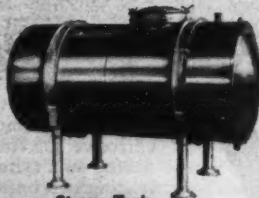
Vacuum Pan  
50 to 500 gal.



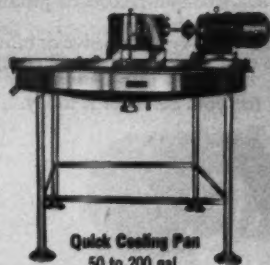
Style CW  
Two-thirds Jacketed  
80 to 300 gal.



Pulp Tank  
500 to 2,000 gal.



Storage Tank  
100 to 5,000 gal.



Quick Cooling Pan  
50 to 200 gal.

# LEE

Technical bulletins  
fully describing  
these processing units  
gladly sent on request.

METAL PRODUCTS CO., INC.  
418 PINE STREET, PHILIPSBURG, PA.

Designers and Manufacturers of  
Corrosion-Resistant Processing Equipment  
for over 25 years.

## CORROSION CONTROL

**Vinyl tube and nylon fittings  
only parts of unit contacted  
by material being pumped . . .**

simple, self-priming pump designed for handling small volume of corrosives

**Uses:** For pumping small volumes of corrosives. Capacity of unit is measured in ounces of water per minute.

**Features:** Outstanding feature of pump is its chemical resistance. Vinyl tube and nylon fittings are only parts of unit in contact with material being pumped. Nylon tube fittings can be eliminated if desired.

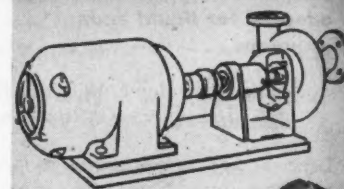


As drive shaft revolves, nylon roller turns in a planetary motion, forcing liquid through vinyl tubing

**Description:** As drive shaft of pump turns, it revolves a direct-drive nylon roller in a planetary motion. Nylon roller exerts pressure against vinyl roller-tube guard, which in turn kneads the vinyl pumping tube carrying the fluid and imparts a positive directional flow to the fluid being pumped. Nylon tube fittings are connected to vinyl tube and held in place by two pump port bosses.

Vinyl tubing can be used satisfactorily with most acids and alkalis. For specific applications, tube can be furnished in neoprene, gum rubber, silicone, buna, or other synthetic resilient compounds. Additional versatility is available by eliminating the nylon tube fittings and furnishing exposed tubing.

**Keep "Down-Time"  
to a Minimum**



**CHEMPRO  
TEFLON  
PACKINGS**

**CHEMPRO  
TEFLON  
SEAL CAGES**

If you are pumping or processing highly corrosive liquids and slurries, the Chempro Teflon<sup>†</sup> Packing-Seal Cage combination can drastically cut packing and shaft replacement, and keep your "down time" to a minimum. Pumping operations that formerly required daily repacking now operate continuously for months without repacking.

**CHEMPRO TEFLON RING PACKING** provides a frictionless, positive seal impervious to chemical attack. Chempro Styles 101 and 201 packing are available in ring sets, solid or split, to fit any pump or process equipment stuffing box.

**CHEMPRO TEFLON SEAL CAGES** for lubricating or cooling stuffing box packing are machined in a single flexible piece that snaps over the shaft, fitting snugly without vibration. They are non-scoring and corrosion-resistant, and last many times longer than metal lantern rings.

### Ordering Information

1. Specify equipment make, model and size
2. Diameter of shaft
3. Bore and depth of stuffing box
4. Number of rings, solid or split
5. Material to be handled

THE ORIGINAL FABRICATORS OF  
TEFLON PACKINGS AND GASKETS

† duPont Trademark



**CHEMICAL & POWER  
PRODUCTS, Inc.**

9 Broadway, New York 4, N.Y.

When inquiring check 7507  
opposite last page

**CHEMICAL PROCESSING**

When inquiring check 7506 opposite last page

## CORROSION CONTROL

Unit has no stuffing box or mechanical seal. It will prime itself up to 25 feet. Body and end cover are made of aluminum. Oil-impregnated bronze bearings are used. Capacity varies from 1 to 19 oz of water per minute, depending on rpm and head.

(Model 40 pump is product of Becher Pump Co., Dept. CP, 852 Belmont Ave., Chicago 14, Ill. . . . or for more information check 7508 on form opposite last page.)

### **Teflon hose for aircraft uses also suitable for corrosive chemical applications . . .**

remains strong and flexible at temperatures from  $-100$  to  $450^{\circ}\text{F}$

**Uses:** Although originally designed for aircraft applications, hose is also suitable for a variety of uses in the chemical, pharmaceutical, and process industries, in addition to atomic energy installations.

**Features:** Hose has high chemical resistance. It remains strong and flexible at temperatures from  $-100$  to  $450^{\circ}\text{F}$ .

**Description:** Basic material from which hose tube is made is Teflon. This seamless Teflon tube is reinforced with braids of stainless steel wire for strength and added resistance to corrosion.

(Teflon hose is available from B. F. Goodrich Industrial Products Co., Dept. CP, Akron, Ohio . . . or for more information check 7509 on form opposite last page.)



"... It's a breeze . . . All I do is sit here and watch the boiler pressures go up and down . . ."

## **new coating process for reaction vessels— outlasts heavy-duty glass linings 2 to 3 times**

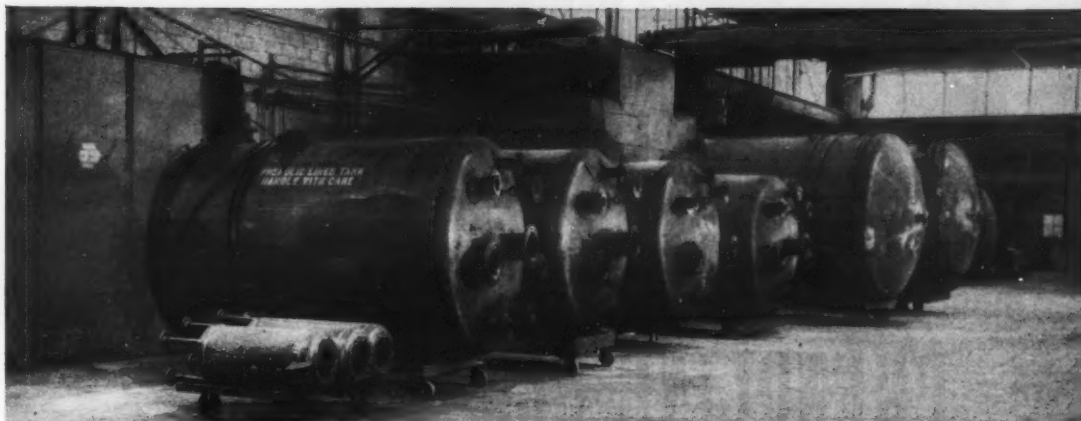


Photo of reaction vessels  
courtesy Metal-Cladding, Inc.  
No. Tonawanda, N. Y.

### **Applied at lower cost—new METCO System also provides superior abrasion resistance**

A new coating process, involving metallized nickel or stainless steel, sealed with baked Epon Phenolic, has been developed to provide superior protection for the interiors of reaction vessels.

In one typical application at a plant engaged in extraction and refining of rare metals, a chemical reaction involving the boiling of hydrochloric acid had been handled in glass-lined equipment. Service life of these vessels was unsatisfactory since the acid would inevitably reach a junction of glass and steel at hand-hole flanges, nozzles, etc., and work between the metal and the glass lining. After a few months the hydrogen accumulation caused the glass to pop off the metal.

As a result this plant called in a Metco Systems contractor who applied the sprayed metal and phenolic coating system which outlasts the previously used glass lining from 2 to 3 times. They have found that not only is the chemical resistance better, but the abrasion resistance of the combination system is superior to glass. Another feature of the new system is that a break in the coating does not cause the severe undercutting found with glass failures.

\*Reg. U. S. Pat. Off.

The following Metco\*  
System Contractors  
are set up to help  
you solve your  
corrosion problems.  
For further information  
or copy of descriptive  
bulletin, write, wire, or  
phone the Metco System  
headquarters—address  
and phone number below.

#### **Metco System Contractors**

Akron Sand Blast  
& Metallizing Company  
Arthur Tickle Engineering Works, Inc.  
Dix Engineering Co., Inc.  
F. W. Gartner Company  
Gulf Engineering Company, Inc.

Metal-Cladding Inc.  
M W Protective Coatings  
Div. of Metalweld, Inc.  
St. Louis Metallizing Co.  
The Southern Galvanizing Company  
Steel and Tank Service Co.

### **Metco Systems**

10 Bridge Street, Westbury, Long Island, New York  
Telephone: EDgewood 4-1308

#### **METCO SYSTEMS**

10 Bridge Street, Westbury, Long Island, New York

Please send me descriptive bulletin on the new Metco System.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 7510 opposite last page





## a new, proven system for longer protection against corrosion **PHENOLINE 305**

- ◆ **HEAVY DUTY MAINTENANCE PROTECTION** in severe corrosive atmospheres for structural steel and equipment exteriors. Also used as concrete floor protection.
- ◆ **BETTER, MORE POSITIVE PROTECTION** against entrained vapors and splash of solvents, caustics and acids of high concentration. Phenoline 305 contains 86% solids and has less solvents, resulting in non-porous film. Successive coats not required to seal porosities—characteristic of thin, low solids materials.
- ◆ **MORE ECONOMICAL PROTECTION** because Phenoline 305:
  - gives 2-3 times longer life,
  - assures greater thickness in fewer coats, eliminating at least one coat,
  - eliminates 1-2 recoating cycles,
  - reduces plant shutdown time, since fewer coats are required.

### *Use Carboline's Engineering Approach...*

WRITE TODAY for Comparative Data Chart 1005 to help you figure cost per sq. ft. per year of service for any coating system. Also complete details on Phenoline 305.

SALES OFFICES in New York, Philadelphia, Detroit, Chicago, Houston, Los Angeles, San Francisco and other leading cities.



333 Thornton Ave., St. Louis 19, Mo.

A Division of Mullins  
Non-Ferrous Castings Corporation

**Specialists  
in Corrosion Resisting  
Synthetic Materials**

When inquiring check 7511 opposite last page

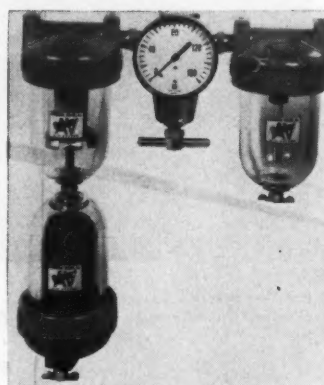
## CORROSION

**Sludge in air trapped,  
preventing corrosion,  
excessive wear . . .**

assists pneumatic equipment  
to operate properly

**Uses:** For filtering, regulating,  
and lubricating compressed air  
used in the operation of pneu-  
matic equipment.

**Features:** Sludge formed of  
dirt, scale, rust and moisture is  
automatically trapped by filter.



Air control assembly filters, reg-  
ulates, lubricates compressed air

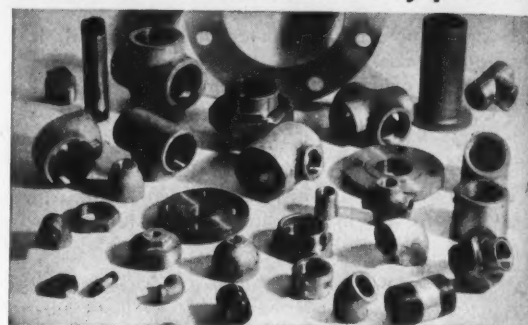
**Description:** After air is cleaned  
and regulated to desired pressure,  
a fine oil mist is added by lubri-  
cators. This lubricated air is car-  
ried to operating parts of the  
equipment, insuring proper effi-  
ciency. Assembly provides visi-  
bility of operation while 98% of  
moisture is removed with negli-  
gible loss in air pressure.

(Air Control Assembly is prod-  
uct of Airmatic Valve, Inc., Dept.  
CP, 7317 Associate Ave., Cleve-  
land 9, Ohio. Check 7512 oppo-  
site last page.)

### **Weldirectory for stainless**

Directions for proper welding  
of stainless steels, as well as a  
number of other metals are  
given in 28-page publication.  
Bul SB-1352 is issued by The  
Lincoln Electric Co., Dept. CP,  
Cleveland 17, Ohio. Specify  
7513 opposite last page.

## EVERY TYPE to fit every problem



### **INCO-CAST Fittings CORROSION-RESISTING Monel® nickel-copper alloy & Nickel**

- Resist most corrosives
- Withstand high and sub-zero temperatures
- Strong, tough, sound
- Protect product purity
- Pressure-tested
- Economical in cost
- Controlled alloy composition
- All standard types and sizes in threaded and welding fittings
- Fast service on rated orders to all points from conveniently located distributor stocks
- Special shapes and sizes made to order



**The International Nickel Company, Inc.**

67 Wall Street, New York 5, N. Y.

When inquiring check 7514 opposite last page

### **Are you missing the corrosion resistance of PYREX® pipe because you think it will break?**



A plant manager says this about PYREX pipe: "There was no breakage during installation. There have been no lines broken because of the product handled, the temperature involved, or the age of the pipe. In short—there has been no breakage."

Product lines in this plant have been PYREX pipe since 1943. Before the company switched, corrosion in the metal lines made cleaning difficult, frequent replacement made maintenance costly.

Engineers and operating men in hundreds of plants are running hard-to-handle fluids like sulfuric, hydrochloric, nitric and acetic acids; chlorinated hydrocarbons, hydrogen peroxide, bromine, brines and low concentration alkali solutions through their PYREX pipelines with no problems whatsoever.

Your own pipe fitters can install PYREX pipe. It's easy to clean. Maintenance is practically nil. It's durable and costs about the same initially as other corrosion resistant piping. But even if it should cost more than the piping you now use, PYREX pipe would quickly make up the difference in low installation cost, low maintenance cost, long service.

**Make this check**—Probably plants near you use PYREX pipe, know its value in terms of personal experience. We'd like to send you their names so you can talk to people who use glass pipe daily. Ask for a list. Use this publication's reader service for added information.



**CORNING GLASS WORKS  
CORNING, N. Y.**

*Corning means research in Glass*

When inquiring check 7515 opposite last page

CHEMICAL PROCESSING

## CORROSION

### **Pipeline carrying sulfuric and alcohol protected by coating . . .**

consists of glass-cloth tape and epoxy resin

Coating, which consists of glass-cloth tape bonded with epoxy resin, is being used to protect a 4" pipe at the South Charleston, W. Va., plant of Carbide and Carbon Chemicals Co. Coating is used on a 100' long transfer line which carries alcohol and strong sulfuric acid at 70 to 100°C at low pressure.



Fittings and pipe wrapped with glass-cloth tape bonded with epoxy resin

Coating, which serves as a mechanical reinforcement for the pipe, can withstand corrosives in area. Epoxy resin was chosen for application because of its excellent adhesion to glass as well as for its toughness and resistance to impact.

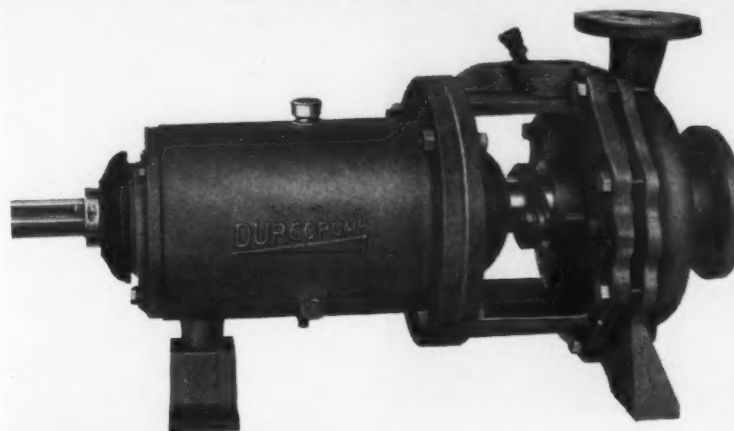
(Epoxy resin is product of Bakelite Co., Div. Union Carbide and Carbon Corp., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information check 7516 on the convenient Reader Service slip which is located opposite last page.)

For more information on product at right, specify 7517 . . . see information request blank opposite last page.



## **all new** SERIES **H** DURCOPUMPS

### **NEW for heavy duty corrosion service**



Series H DURCOPUMPS are all new, heavy duty chemical pumps. With a large, rugged shaft, heavy bearings, open or closed impeller and new features of adaptability, these pumps provide long, dependable pumping life with easy, low-cost maintenance. Designed for high heads and low capacities as well as for routine conditions, Series H Durcopumps can provide the answer to your tough pumping problems.

### **NEW for easy modification and minimum spare parts inventory**

**only**  
**3** **BEARING**  
**HOUSINGS**  
**for**  
**the**  
**complete**  
**range of**  
**pump**  
**sizes**

The entire range of new Series H Durcopumps is accommodated by just three bearing housings and suitable adaptors. This unique feature coupled with the availability of eleven standard Durco alloys make the Series H DURCOPUMPS the most versatile chemical pumps ever developed.

Let us help you solve your difficult pumping problems.



Write for Durco Bulletin P/8, or call the Durco engineer located near you.



**THE DURIRON COMPANY, Inc. / Dayton, Ohio**

BRANCH OFFICES in Atlanta, Boston, Buffalo, Chicago, Cleveland, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia, and Pittsburgh.



## this "Buffalo" pump moves your acids on rubber



"Buffalo" Rubber-Lined

Pump with upper half of casing removed.

### -REDUCING COSTLY DOWN-TIME -ELIMINATING EXCESSIVE REPLACEMENTS

If you are pumping highly corrosive liquids, or liquids containing abrasive solids, you may be paying the high price of short pump life. However, where such severe service destroys ordinary pumps in a hurry, "Buffalo" has the answer: *what acids can't touch, they can't hurt.* And in this "Buffalo" Pump, the liquid contacts nothing but rubber, vulcanized to the impeller and passages.

Pump life is multiplied many times and the cost of rubber lining is negligible when compared to the savings in down-time and replacements. Have us mail you Bulletin 982 — see this and the other "Q" Factor\* features that save you money and troubles when you specify "Buffalo" Chemical Pumps.

\*The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.



## BUFFALO PUMPS

DIVISION OF BUFFALO FORGE CO.

524 Broadway Buffalo, N. Y.  
Canada Pumps, Ltd., Kitchener, Ont.  
Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

When inquiring check 7518 opposite last page

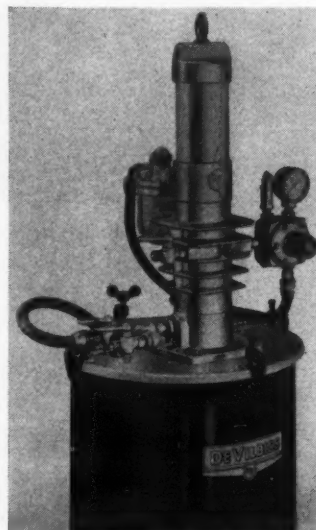
## CORROSION

**Pump handles paint  
easily, efficiently  
without waste . . .**

built with materials resistant  
to solvents

**Uses:** Pump is designed specifically for handling of paint.

**Features:** Pump handles paint easily and efficiently without waste. It has been built throughout with materials resistant to solvents found in paints.



Pump provides paint for sprayers  
directly from 55-gal drum

**Description:** Pump will handle material directly from a 55-gal drum, eliminating the need for frequent refills and thus reducing spillage and waste material. Unit is operated by compressed air, requires no wiring.

In operation, the double-action pump delivers material on both up and down stroke. As many as 18 spray guns can be supplied with more than one quart of material per minute. Any variations in material consumption requirements are compensated for by pump, which automatically speeds up or slows down.

(Paint pump, No. P-QBF, is product of The DeVilbiss Co., Dept. CP, 300 Phillips Ave., Toledo 1, Ohio. Check 7519 opposite last page.)



## Plastic Coating Stops Costly Condensation Drip and Rust

THE COSTLY PROBLEM caused by dripping from this sweating pipe was permanently solved with one easy and inexpensive application of NoDrip Plastic Coating. Sweating pipes, ceilings, air ducts and other metal equipment are also completely protected against rust and corrosion by low cost NoDrip.

NoDrip Plastic Coating acts immediately to insulate and protect. One application adds many years of service life to metal equipment. NoDrip is also resistant to acid, alkali and brine...protects concrete, brick, plaster, tile wood or composition surfaces.

Easy application requires no special equipment or skill. Anyone can apply NoDrip with brush, trowel or spray. Stop your condensation problem now! Get full details without delay.

JW **Mortell**  
COMPANY



FREE

32-PAGE NoDrip DATA HANDBOOK  
Complete with photographs, charts and technical information to solve your condensation problem. Write today.

Available at leading plumbing and mill supply houses

J. W. MORTELL CO. 530-1 Birch St., Kankakee, Ill.  
Please send my FREE copy of the NoDrip Data Handbook.

Name \_\_\_\_\_  
Company \_\_\_\_\_ Title \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 7520 opposite last page

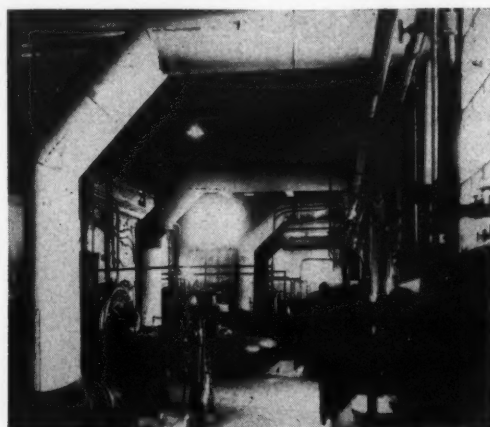
CHEMICAL PROCESSING

**Monel piping gives long service handling salt water for cooling in California refinery . . .**

18" diameter pipes replace those that failed after short period of service

**Problem:** Four large diameter cast iron pipes handling salt water for a cooling system of a California refinery failed after an uneconomically short period of service.

**Solution:** As former piping corroded out, it was replaced with 18" diameter pipes fabricated from 1/4" Monel. Factors in the selection of the nickel-copper alloy for the replacement piping were: 1) its extremely high resistance to corrosion by sea water, 2) its high strength-to-weight ratio, 3) the ease with which it can be cut, formed, and welded, and 4) its lightness in weight.



Four 18" diameter pipes fabricated of Monel which handle sea water in a California refinery

**Results:** Monel piping is still sound after six years of handling the corrosive salt water. Other Monel piping in the refinery is still in use after thirteen years.

(Monel is product of The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. . . . or check 7521 on form which is located opposite last page.)

**Assists engineers in selection of condenser tube alloys**

Application and installation of condenser and heat exchanger tubes is discussed in a 44-page manual designed to assist engineers in the selection of condenser tube alloys.

Bul B-2 is issued by The American Brass Company, Dept. CP, Waterbury 20, Conn. When inquiring specify 7522 on form opposite last page.



## You can see why Saran Lined Pipe cuts corrosion costs

**It's made of corrosion-resistant saran swaged into rigid non-bursting steel . . . liquid never touches metal in these installations**

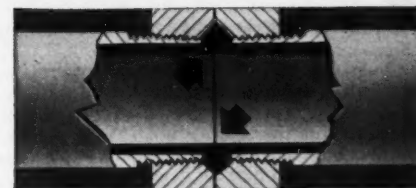
Here's your best way to convey acids, alkalis and other corrosive liquids—saran lined pipe, fittings and valves. This modern piping is corrosion resistant . . . forms snug, leakproof joints . . . is available for working pressures up to 150 psi. Fittings and valves are also available in steel for working pressures to 300 psi.

Installation costs are low with saran lined pipe, fittings and valves. Saran lined pipe can be cut and threaded in

the field with available pipe-fitters' tools. Its rigidity means few supporting structures are needed.

Saran lined pipe has an outstanding record of trouble-free performance in the chemical, petroleum, waste, pulp and paper, metal finishing, and food processing industries. For further information send in the coupon at the right. THE DOW CHEMICAL COMPANY, Midland, Michigan.

*Saran Lined Pipe is Manufactured by  
The Dow Chemical Company, Midland, Michigan*



Liquid never touches metal in saran lined pipe even at a flanged connection like this.

Saran Lined Pipe Company  
2415 Burdette Avenue  
Ferndale 20, Michigan  
Dept. SP625B-1

Please send me information on saran lined pipe, valves and fittings.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

you can depend on DOW PLASTICS

**DOW**

When inquiring check 7523 opposite last page





Typical AiroViber vibrator installation to keep bulk materials moving.

## Low cost AiroViber speeds movement of bulk materials by trouble-free vibration

Operates quietly, effectively in wide range of temperatures; requires no maintenance

**Trouble-free**—External vibration for effective movement of bulk materials in loading, unloading, moving, packaging, processing, grading or separating is now available to you in the low cost AiroViber vibrator. Simple design of AiroViber involves only one moving part and ends necessity of down time for periodic maintenance or lubrication. It also includes a noise reducing design that eliminates annoyance of sounds often experienced in ordinary types of vibrators.

AiroViber's one-moving-part construction assures you of continual operation in wide range of temperatures. It will also start and operate at all times and is not affected by humidity.



AiroViber's simple design assures trouble-free vibration.

### How It Operates

Vibration necessary to keep materials from jamming, arching or hanging up in bins, hoppers, chutes, feeders... is created by the AiroViber vibrator through action of a single heavy steel ball blown by compressed air around a hardened and ground steel track in the housing. A strong centrifugal force developed by the weight of the ball is then transmitted by the vibrator through its mounting into the object being vibrated.

### Installation Is Easy

Because of its simplified design, AiroViber may be installed quickly and easily. And, since no upkeep is required, you can install this vibrator in hard-to-get-at locations... fully confident that it will operate for a long time without lubrication or maintenance. Special line oilers or air filters are not needed... merely hook up an air hose large enough to deliver air specified for the unit you select.

Find out how AiroViber vibrators can save you money and time in moving bulk materials. For illustrated literature and address of nearest distributor, write Viber Company, 726 South Flower St., Burbank, Calif., Dept. 10C9.



VIBRATORS SINCE 1931

When inquiring check 7524 opposite last page

## material handling

Over 200 different dry-powder formulas, from 52 raw materials, are blended by Dearborn Chemical Co. Standard automatic handling equipment, interconnected, has enabled them to . . .

# INCREASE MANPOWER EFFICIENCY 1300% IN BLENDING DRY POWDER



**THEODORE W. WETT**, Assistant Editor  
With **LESTER SAGAR**, Production Manager  
Dearborn Chemical Co., Lake Zurich, Illinois

Effective increase of manpower efficiency of 1300% has been achieved by judicial interconnection of standard material handling, weighing and blending equipment at Dearborn Chemical Co.'s recently completed dry-powder compounding plant in Lake Zurich, Ill. Push-button blending is used for over 200 different formulas for water conditioning and corrosion control, compounded from 52 raw materials. Plant production, 98,000,000 lb/yr, is turned out by 16 operating and maintenance personnel, or about 6,125,000 lb/man/yr. On a similar basis, using former methods at old Chicago plant, production was 438,500 lb/man/yr. Thus,

by comparison, present system has increased efficiency by approximately 1300%.

Bulk dry chemicals, including tannin; soda ash; sodium bicarbonate, bichromate, and bisulfate; sodium sulfite; phosphate wetting and dispersing agents; and potassium carbonate, are received in either box cars or hopper cars on company's siding. They are unloaded by means of three pneumatic conveyors, each capable of handling 10 tons of material per hour. Two of units are stationary, servicing six storage bins each. Third system, a traveling one, delivers material to any one of 24 storage bins. Bins hold 1700 cu ft which with high-density compounds may run over 100,000 lb.

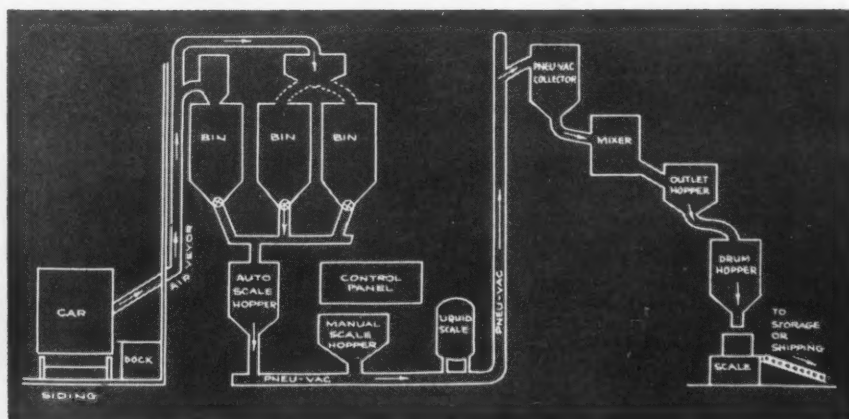
In order to avoid any possibility of explosive conditions being reached, storage bins containing material which has a critical mixture are blanketed with an inert gas.

# ER EFFICIENCY NG DRY POWDERS



Traveling pneumatic conveyor (center background) delivers raw materials to any one of 24 storage bins. Two other stationary units serve remaining 12 bins

Flow of material in receiving, storing, and blending 52 raw materials for over 200 formulas



Storage bins are equipped with interlocked electrical devices to cut off conveyor in event bin becomes overloaded. Similarly, they have low-level indicators that change bin-feed during compounding operations from an empty bin to a full bin of identical material. This change is so interlocked that sequential feed insures usage of material in same order in which it was received. In six bins, for example, sequence is 1-2-3-4-5-6, and then back to 1.

After formula for a given product, which can contain up to 12 components, has been set on automatic weigh-scales, chemicals are automatically fed from required bin in order in which each weight was set on scales. Chemicals are fed through a rotary vane feeder into a screw conveyor, and then into scale hopper. Drive motors for screw conveyors are two-speed. A reduction in speed occurs automatically when weight of material delivered to scale hopper comes within 50 pounds of desired weight. Remaining 50 lb are "dribbled" in to prevent overweighing. Very small quantities of an ingredient are dumped manually into a separate hopper

(Please turn to next page)

## when you need WIRE CLOTH PARTS



## Call Cambridge for accurate production, fast delivery

Our engineers in the field and in the home office are ready to discuss your wire cloth fabrication problems at all times. They'll help you select weaves, mesh sizes and metals to meet your needs and draw up prints for your OK . . . or, they'll start the factory working from your prints. Whether orders are small or large, you're assured of strict adherence to specifications by close manufacturing supervision.

Your parts will be fabricated from any conceivable type of industrial wire cloth, selected from the complete Cambridge line. Specifications from the finest to the coarsest mesh in any metal or alloy are usually met from stock, assuring the speediest delivery. Individual loom operation and careful inspection provide the maximum in mesh size uniformity and mesh count accuracy.

### IF YOU BUY WIRE CLOTH IN BULK . . .

You can get immediate delivery on large or small orders for the most frequently used types of cloth. If your needs are not in stock, we'll schedule our looms to get your material to you without delay.

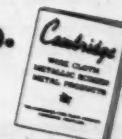
LET US QUOTE on your next order for fabricated parts or wire cloth in bulk. Call your Cambridge FIELD ENGINEER—he's listed under "Wire Cloth" in your classified telephone book. OR, write direct for FREE CATALOG and stock list giving full range of wire cloth available, description of facilities and metallurgical data.



**The Cambridge Wire Cloth Co.**

WIRE CLOTH  
METAL CONVEYOR BELTS  
SPECIAL METAL FABRICATIONS

Department F,  
Cambridge 9,  
Maryland



OFFICES IN PRINCIPAL INDUSTRIAL CITIES

When inquiring check 7525 opposite last page



## Bulk Chemical Storage by the SAUERMAN Method



Potash Recovery at Carlsbad

### How Sauerman Scraper Storage Reduces Costs

This prominent producer of basic chemicals uses Sauerman 1½-cu. yd. Scraper Machines to reclaim potash at 200 tph. Total area covered is approximately 125 by 370 ft. Building capacity is 60,000 tons.

Here's how a Sauerman Machine cuts costs:

One operator, located in a safe station overseeing the entire area, can recover practically 100% of all stockpiled material.

All highly machined parts, hoists and motors can be located outside of the building and protected from corrosion and dust.

When parts are replaced—sheaves, clutch or brake linings—the machine is restored to practically new condition, even though it may be twenty or more years old.

Only the Crescent scraper and cables contact the material. The scraper machine can be designed to operate the scraper on top of non-caving material. This allows the scraper to break down any high faces that may be standing.

Sauerman Storage Machines are built for hourly capacities of from 20 to 600 cu. yds. A partial list of chemical producers and manufacturers using some type of Sauerman equipment includes:

Consumers Cooperative Assn.  
Crawford Chemical Co.  
Devision Chemical Co.  
Division of W. R. Grace & Co.  
Duval Sulphur & Potash Co.  
F. S. Royster Guano Co.  
Hi-Yield Fertilizer Co.  
International Minerals & Chemical Corp.

Lion Oil Co.  
Mississippi Federated Cooperatives (AAL)  
Meridian, Miss. Branch  
Potash Company of America  
Red Star Fertilizer Co.  
Southern Agricultural Fertilizer Co.  
Tennessee Farmers Cooperative  
Virginia-Carolina Chemical Corp.

For ways to reduce your material handling costs, write to Sauerman's experienced engineers. Request Catalog E, Bulk Storage by Scraper, plus Field Report 227 and other reports on the handling of your material by Sauerman Machines.

**SAUERMAN BROS. INC.** 624 S. 28th Ave. • Bellwood, Ill.

When inquiring check 7526 opposite last page

## MATERIAL HANDLING

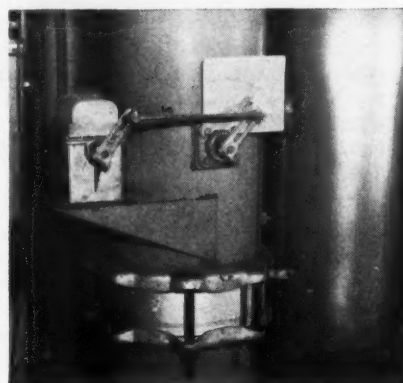
### Blending Dry Powders

(Continued from preceding page)

for inclusion in compounding operation. Liquid ingredients are automatically weighed in a separate scale hopper for subsequent spraying into mixer.

There are three scales on each of two production lines. Two scales are 6-beam units, and the third a 12-beam. Batches up to 4000 lb can be processed in each line.

After all ingredients have been delivered to scale hoppers and scales "zero out", materials are automatically fed into another pneumatic conveying system, carried to a collector, and fed directly into a Worthington Ransome mixer. Conveyor is a closed system operating at an equilibrium temperature of 180°F.



Remote Control

*"Practical" engineering played an important part in achieving essentially trouble-free operation of automatic handling system at Dearborn's Lake Zurich plant. Two examples of this are:*

Constant load is maintained on blower motor for pneumatic conveyor system between scale and mixer by a variable damper developed at Dearborn's request by Sprout-Waldron. Damper is automatically positioned by a Barber-Colman unit, activated by a change in motor current to maintain current at approx 90 amp under all load conditions. Motor-current surge, when product is discharged into air stream, is kept to a minimum and a relatively constant air-stream velocity maintained.

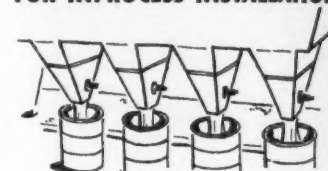
Bridging in storage hoppers is reduced by installation of a flat metal plate in conical portion of storage bins to form an annular opening between plate and bin wall. Plate bears weight load of stored material which can then feed along its natural angle of repose more easily. Material between bottom of plate and hopper outlet is thus loosely packed since it is not compressed by weight of bin contents pressing down on it. Slight bridging that does occur in annular space can be controlled by a vibrator installed on each bin.

**DON'T GET  
Hung-up**  
THERE IS A  
**Cleveland Vibrator**

### FOR INCOMING RAW MATERIALS



### FOR INPROCESS INSTALLATION



### FOR PACKAGING



and for all other bin applications in the handling of dry or viscous chemicals. Prevents bridging, plugging and arching — keeps chemicals moving — eliminates processing delays.

Write today for literature and engineering details.

Air or Electric

Portable or Permanent

Silent or Standard



2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 7527  
opposite last page

CHEMICAL PROCESSING



Push-button blending at Dearborn Chemical is controlled from electrically-operated control panel and weigh-scales

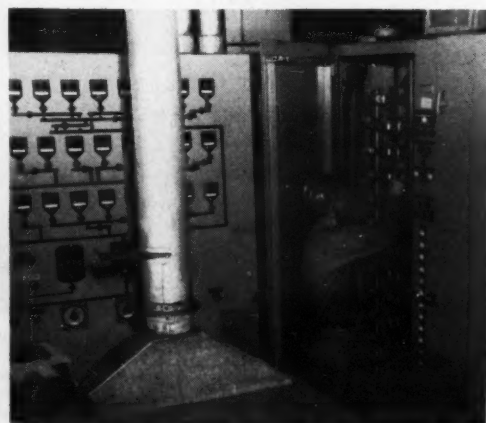
Uniform mixing, and prevention of buildup on mixer walls, is assured by welding lengths of link chain to inside of mixing unit. Whip is given to chain when mixer rotates, walls are scoured clean, and any lumps formed in formula being mixed are broken.

Mixer discharges, after a predetermined mixing time, directly to one of three drumming hoppers. In some special cases, material is passed through a hammer mill into an intermediate outlet hopper and then to drumming hopper.

A sample is taken for quality control determination. If batch passes specs it is discharged into kegs, drums, or bags as required. For hygroscopic formulas, fiber drums with Geon or polyethylene liners are used.

(Airveyor pneumatic conveyor for unloading raw material was supplied by Fuller Co., Subsidiary of

(Please turn to next page)



Setting weights for components of dry-powder formula on weigh-scale beams

# ALLIS-CHALMERS NEW TS-260 Motor Scraper



**power-**

**matched**

**for low-cost dirt**

**200 HP**

**11 YD  
(STRUCK)**

**14 YD  
(HEAPED)**

**Power-Matched to capacity.** With more than 18 horsepower for every yard of struck capacity, the new TS-260 has plenty of power to move loads at full speed—under all conditions.

**Power-Matched to strength.** The TS-260 has the structural strength and balance to effectively utilize all of its horsepower . . . with extra capacity built into the clutch, transmission, final drives and drive axles . . . and with a heavy, all-steel, box-type tractor frame.

**Power-Matched for speed.** With plenty of engine power, the TS-260 loads fast, hauls fast, dumps fast . . . moves big payloads at low cost, even under tough conditions.

**Power-Matched for operating ease.** Overlapping gear speeds in all four gear ratios reduce gear shifting, speed work cycles. And with 90-degree steering for rapid maneuvering in close quarters, it's easy for the operator to get the most out of the TS-260.

**"Live-action" hydraulics for sure control.** Gear-driven pump provides constant power for steering and scraper operation.

**Positive 90-degree steering for close-quarter maneuverability.** A 30-degree turn of steering wheel directs full pump flow to two double-acting steering jacks for fast, positive turns up to 90 degrees. For slow turns, a slight turn of the steering wheel provides smooth response.

**"Boiling action" loading for big payloads.** Curved bowl bottom and offset cutting edge team up to build heaped loads fast.

**Quick, clean spreading with high apron and forced ejection.** Apron moves ahead and up when ejector goes forward . . . providing high apron lift and exceptionally large opening.

**Big 200-horsepower Allis-Chalmers diesel engine.** Here is plenty of reserve for low-cost operation . . . plus "follow-through" combustion for smooth, steady performance.

**New easy-shifting transmission.** New clutch brake and gear overlap make it easy to shift smoothly, maintain steady acceleration and full pulling power.

**Heavy-duty power train.** The engine, clutch and constant-mesh transmission are assembled as a unit to assure accurate alignment. Simplified removal of each individual component provides easy serviceability.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

**Get all the facts from your Allis-Chalmers dealer . . . now!**

# ALLIS-CHALMERS



When inquiring check 7528 opposite last page



## MATERIAL HANDLING

### Blending Dry Powders

(Continued from preceding page)

General American Transportation Co., Dept. CP, Fuller Building, Catasauqua, Pa. . . . or for more information check 7529 on form opp. last page.)

(Weigh-Scales are product of Buffalo Scale Co., Inc., Dept. CP, 46 Letchworth St., Buffalo 13, N.Y. . . . or check 7530 on form opposite last page.)

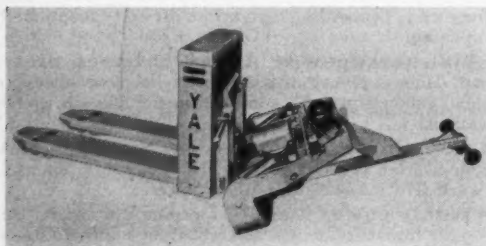
(Pneu-Vac conveyor for mixed batch, mechanical conveyor, and rotary-vane feeder were supplied by Sprout-Waldron & Co., Inc., Dept. CP, Muncy, Pa. . . . or check 7531 on form opposite last page.)

### 'Breakaway' design simplifies maintenance — exposes all mechanisms . . .

removal of two pins permits truck front to swing away from battery compartment

Designed to ease maintenance, "breakaway" design of pallet truck allows whole front to open away from battery compartment with removal of two pins, one on each side of truck. When front is open, every hydraulic and mechanical unit becomes immediately accessible for service. In addition, the hoist motor can be pivoted forward into the battery compartment for easy cleaning or brush renewal.

Available in two- and three-ton capacities, units can be fitted with two different size battery compartments. Short compartment models accommodate six-cell,



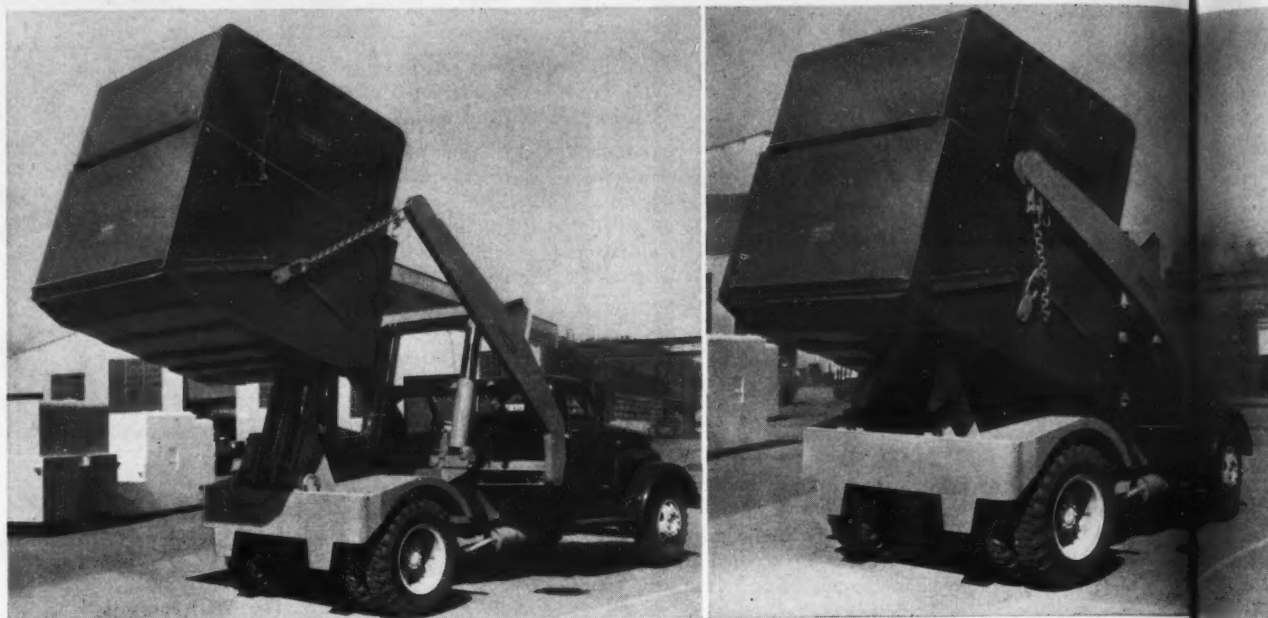
All hydraulic and mechanical units are accessible

thirteen-plate (or comparable nickel alkaline) model and are only 24 inches longer than the load. Larger model takes six-cell, 25-plate battery and is 33 inches longer than load.

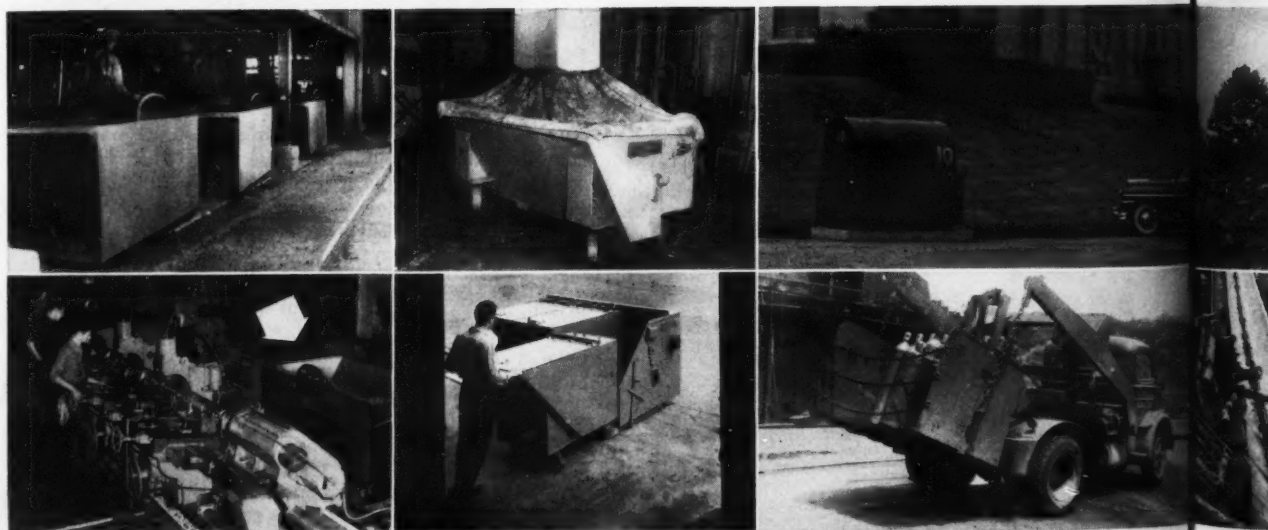
Elevating linkage, using compression tubes mounted high in pallet forks, provides underclearance of more than five inches. New models have two speeds forward and two reverse, controlled by dual cams at fingertip reach from steering handle crossbar.

("Breakaway" Worksaver pallet truck is manufactured by Yale Materials Handling Division, Yale & Towne Mfg. Co., Dept. CP, 11000 Roosevelt Blvd., Philadelphia 15, Pa. . . . or for more information check 7532 on form opposite last page.)

## Here's the most versatile....lowest cost of bulk materials handling by truck ever



### With only one man, it PICKS UP . . . HAULS . . . Serves scores of big steel containers, all sizes and



It's the **DEMPSTER®** System

ABOVE ARE BUT A FEW of the hundreds of different Dempster-Dumpster Detachable Containers at work in industry today—containers built in capacities up to 21 cu. yds. . . . several times the capacity of the average dump truck body. It's like having one truck with scores of bodies!

ost  
ver  
method  
devised!



Here's MASS-HANDLING of bulk materials with one truck . . . one man! Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvage materials, raw and finished products, fluids, including acids, combustibles, dusty materials, etc. No other method handles waste and bulky materials so cheaply!

. . .  
and  
and DUMPS (or sets load down intact)  
designs — handling materials of every description



of dif-  
ners at  
capaci-  
ng one  
WITH NO OBLIGATION on your part, our engi-  
neers will be glad to make a comprehensive fact-  
finding survey to determine the cost-cutting pos-  
sibilities of this equipment in your plant. Ask us for  
complete information. Manufactured exclusively by  
Dempster Brothers, Inc.

**DEMPSTER BROTHERS**  
296 N. KNOX, KNOXVILLE 17, TENNESSEE

## MATERIAL HANDLING

### Trunnion steer wheels increase maneuverability of line of lift trucks

Line of gasoline powered lift trucks, available in models of 3000, 4000 and 5000 lb capacity, is designed by Henry Dreyfuss, noted industrial designer.

Trunnion steer wheels, short overall length and short turning radius provide high maneuverability. Self energizing brakes have total of 125 square inches of braking area. Low center of gravity and long wheel base increases unit's stability.



Long wheel base and low center of gravity provide stability on fork truck line

One and a half and two ton models have load lift speed of 50 fpm, and 5000 pound model has lift speed of 48 fpm. Forward travel speed is 13.8 mph on all models. Constant mesh transmission provides quiet operation and easy shifting. Large 7.50 x 15 industrial tires increase traction and flotation over varied surface conditions whether inside or in yard areas. Cantilever swing-up engine hood fully exposes internal mechanism for maintenance.

Optional equipment includes power steering, fluid torque converter drive, LP-gas installation, dual front wheels and overhead guard.

(Lift truck series is manufactured by Hyster Co., Dept. CP, 2902 N.E. Clackamas St., Portland 8, Oregon . . . or check 7533 opposite last page.)

### How to handle acrylonitrile

Covering such topics as materials of construction, storage tank design, piping, pumps, valves and filters, four-page bulletin covers basic problems of acrylonitrile handling.

Technical Service Bulletin RM-20 is issued by Monsanto Chemical Company, Plastics Division, Dept. CP, Springfield, Mass. Specify 7534.



# PALMER-SHILE

## Materials HANDLING EQUIPMENT

Engineered and Built  
to meet your needs

### CONTROLLED PRECISION DUMPING or POURING



Especially ideal for handling chemicals, solvents, powders, etc. Unit for handling corbays also available. Equipped with two safety type locking devices and all steel, welded yoke. Turns 360° through worm drive. Hand-operated chain drive or 12" O.D. hand wheel.

Item B-731  
\$198.50

### LOADING and UNLOADING TRUCKS



Handles drums, barrels, kegs that have a lip. Excellent for handling draining of drums. Heavy welded chain and forged grab hooks. Weight approx. 8 1/2 lbs.

Item B-205  
\$18.50

### CONVENIENT, SAFE HANDLING of LIQUIDS with



Item  
NS 506 DH  
(detachable  
handles)  
\$54.90

DETACHABLE  
HANDLES

Item NS 506  
(handles welded  
to frame)  
\$52.70

This dual purpose truck can be used to move barrels or drums and also serve as a drain rack. Available in two styles—handles welded to frame or with detachable handles that can be pulled out to conserve floor space. One set of handles can serve any number of trucks. Sturdy welded construction. Free-rolling 8" roller bearing wheels. Weight approximately 90 lbs.

DESIGNED AND MANUFACTURED BY

# Palmer Shile Co.

16016 FULLERTON AVE. DETROIT 27 MICH.

BOSTON, Mass., CO 6-0570 • BURLINGAME, Calif., DI 2-0823 • CHICAGO, Ill., AL 5-3984 • CLEVELAND, Ohio, SU 1-3235 • DENVER, Colo., AL 5-3984 • FORT MYERS, Fla., CE 8-6881 • FORT WAYNE, Ind., KE 5408 • INDIANAPOLIS, Ind., ME 5-2587 • LOS ANGELES, Calif., RA 3-3733 • ST. LOUIS, Mo., PR 1-1474 • WHITE PLAINS, N. Y., White Plains 6-1354

## MATERIAL HANDLING

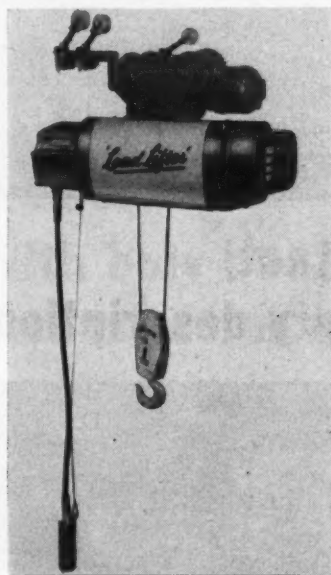
Rated at up to 6 tons,  
trolleys have speeds  
to 130 fpm ...

trolleys are adjustable to fit  
various beam sizes

Uses: Single-speed, pushbutton controlled power trolley is designed for installation on electrically driven hoist having capacities of 1000 to 12,000 lb.

Features: All models are adjustable to fit a wide range of I-beams, permitting relocation of trolley to another installation having different size I-beam without reworking the trolley.

Description: Units are available



Trolley accommodates hoists from  
1000 to 12,000 lb

in a variety of traverse speeds, ranging from 25 to 130 fpm, depending on size and voltage requirement. Models are available to meet all standard voltages.

Trolleys are constructed with side plates of non-fracturing rolled steel plate and have full crowned universal traverse wheels with hardened treads.

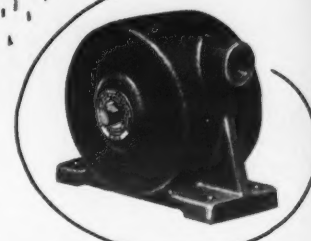
Drive wheels have integrally cut heat-treated, spur geared teeth. Each wheel rotates on permanently lubricated ball bearings.

Driving mechanism consists of

## EFFECTIVE, ALL-DIRECTIONAL VIBROLATION

**MOVES GRANULAR  
OR WET MATERIAL  
NOISELESSLY**

The simplest, most quiet answer for moving materials in hoppers, chutes and bins. One moving part, no lubrication, no maintenance, never harms the equipment on which it is mounted. Instantly self-starting every time. Vibrolator is the only vibrator that can guarantee this regardless of operating conditions. Write for catalog. You will also receive form for describing your problem. No obligation!



### VIBROLATORS®

©Vibrolator is a registered trade name and applies only to the patented Peterson Vibrolator.

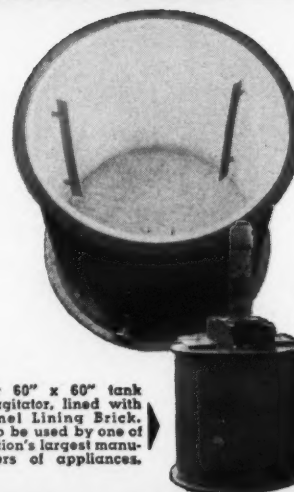


ENGINEERING COMPANY

155 KEMP ST. NEPONSET, ILL.

When inquiring check 7536 opposite last page

## MCDANEL



New 60" x 60" tank with agitator, lined with McDanel Lining Brick. Soon to be used by one of the nation's largest manufacturers of appliances.

### TANK LINING

**CLEAN! PURE!  
NON-CONTAMINATING!**

● Tank's contents are guaranteed safe storage until used. McDanel Lining Brick does not contaminate or alter formula of tank's contents. Has excellent resistance to corrosion and chemical action. Fins or other protrusions from inside walls offer no installation problem. McDanel Lining Brick sets easily around sides and bottom. Broken joint installation provides custom fit for every size tank.



McDANEL  
REFRACTORY PORCELAIN COMPANY  
BEAVER FALLS, PENNSYLVANIA

Write today for Bulletin  
B1-55 on McDanel Tank  
and Mill Lining Products

When inquiring check 7537 opposite last page

CHEMICAL PROCESSING

When inquiring check 7535 opposite last page

## DO YOU NEED STANDARD PITCH

### —OR DOUBLE PITCH ROLLER CHAIN?

▲ Whether your application demands high or low speed, or transmits high or low power, requires short or long shaft center distances, Diamond has the roller chain to do your job best and give you the greatest operating economy.

Over 65 years of experience in the design and production of roller chain is at your disposal. Have the Diamond engineering staff give you sound recommendations. Catalog 754 contains 64 pages of information you should have. Write for your copy.

#### DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

Dept. 411, 402 Kentucky Ave., Indianapolis 7, Indiana  
Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER.

## DIAMOND



## ROLLER CHAINS

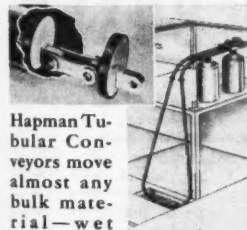
When inquiring check 7538 opposite last page

## HERE'S HELP

THAT SOLVES TROUBLESOME  
BULK HANDLING PROBLEMS:

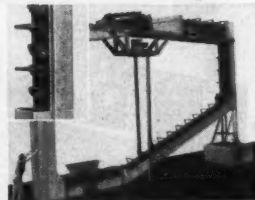
# Hapman

### Tubular and Pivoted Bucket Conveyors



Hapman Tubular Conveyors move almost any bulk material—wet or dry—through any plane or angle. They're dust, liquid and odor-tight. Investigate!

WRITE for Bulletin T-C96



Exclusive top loading device on Pivoted Bucket Carrier handles fragile materials gently. Many other unique advantages.

WRITE for Bulletin P-C96

## Hapman CONVEYORS, INC.

DIVISION HAPMAN-BUTTON COMPANY

KALAMAZOO MICHIGAN  
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 7539 opposite last page

SEPTEMBER 1956

## MATERIAL HANDLING

30-minute rated squirrel cage, face mounted, totally enclosed motor having self lubricated tapered roller bearing. Magnetically interlocked 24 volt, 4 button control station eliminates possibility of damage to system should both "up" and "down" buttons be depressed simultaneously. Cushioned start by means of adjustable ballast resistors is available on larger capacity trolleys to provide smooth acceleration.

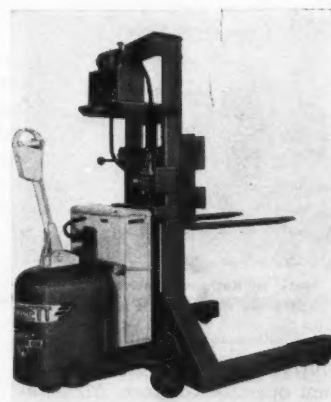
(Series "700" 'Load Lifter' motor driven trolley is manufactured by Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc., Dept. CP, Muskegon, Mich. Check 7540 on form opposite last page.)

**Distributes load weight  
over large area . . .**

two-ton unit provides stability without counterweighting

**Uses:** Truck is designed for handling or stacking of skids or pallets.

**Features:** Unit has ample stability, without counterweighting, due to fact that there are four



Outrigger casters provide maximum stability even when loads are being stored ceiling-high

wheels on the floor at all times. Maximum stability is present even when pallet or unit loads are being stored ceiling-high.

(Please turn to next page)

## CONVEY ALL THE WAY for Speed and Economy



## POWER-CURVE

delivers bags into far end of box-car or truck above stack height—without hand labor. Loader is self-propelled—and as loading progresses, withdraws under own power. Swings left or right—up or down—without stopping. Operator easily slides bags onto stack. Conveying capacity up to 75 tons per hour. Cuts loading costs one-third or more over hand-trucking method. Can be built to meet your conditions.

**NEW MOVIE AVAILABLE**—16mm color-sound film of various POWER-CURVE installations in operation. Shows you more in ten minutes than you can learn from hours of listening or reading. Movies available locally from representatives in all principal U. S. cities. Write for showing.

## POWER-CURVE CONVEYOR CO.

2185 SOUTH JASON STREET • DENVER 23, COLORADO

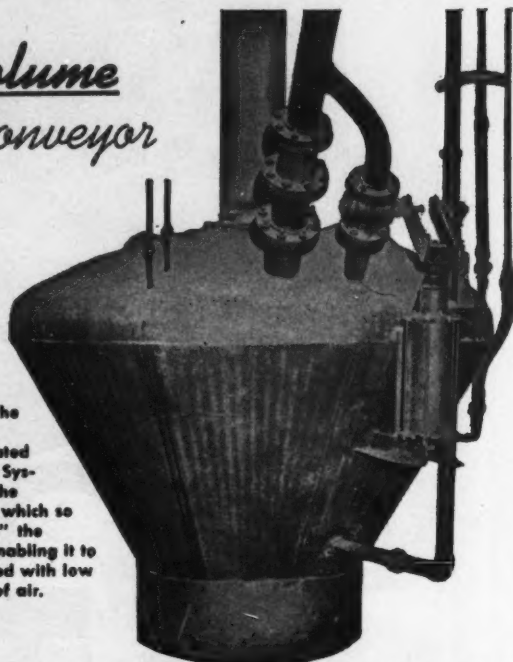
When inquiring check 7541 opposite last page



# Robinson Air-Activated Conveyor

The Low-volume  
Air Conveyor

► Heart of the Robinson Air-Activated Conveyor System . . . the Activator which so "fluidizes" the charge, enabling it to be handled with low volumes of air.



**Averages 1 Cubic Foot of Air per Pound of Materials Handled**

**R**ight here is one reason — and a stand-out reason — why the Robinson Air-Activated Conveyor is so economical in handling bulk dry-pulverized and fine-granular materials. Compressed air costs money so, if you can hold air costs down, as with the Robinson, you keep handling costs down. And no other power is necessary to operate a Robinson System.

The reason why the Robinson System can operate with such low air volume is due to the fluidized nature of the charge when transported through the pipes. Pressure alone will not suffice. It requires this Robinson Air-Activation or fluidizing effect. Material "flows" rather than blasts through.

Many Robinson Systems are in service handling a variety of products and in some cases are transporting them several thousand feet. This system may be just what you need for handling those dry, bulk materials in your plant. It has several outstanding features which we'll be glad to discuss at your convenience.

**ROBINSON**



A Division of  
Morse Boulger Destructor Co.

**CONVEYOR SYSTEMS**

80-T FIFTH AVENUE • NEW YORK 11, N. Y.  
Representatives in Principal Cities

When inquiring check 7542 opposite last page

## MATERIAL HANDLING

(Continued from preceding page)

**Description:** Standard model has capacity of two tons, overall height of 83" and fork elevation of 68". In telescopic mast unit, fork elevations up to 131" can be provided.

(Model STF40 fork truck is manufactured by Barrett-Cravens Co., Dept. CP, 628 Dundee Road, Northbrook, Ill. Check 7543 opposite last page.)

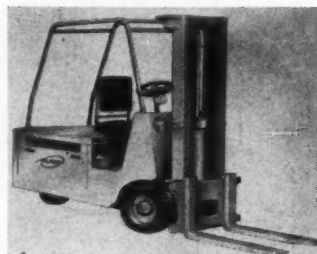
**Lowers head height  
by 18 inches . . .**

trucks designed to operate with minimum headroom

**Uses:** Line of trucks is designed for operation where low headroom is a problem . . . loading and unloading of highway trailers, in tunnels, basements or similar locations.

**Features:** Reduced height of battery compartment locates seat 18 inches lower than on conventional models, without sacrifice of operator visibility.

**Description:** Caster trail axle design makes possible high degree of maneuverability without sacrifice of physical strength.



Truck is designed for operation where low headroom is a problem

Controls are arranged for maximum operator comfort. All models are equipped with hydraulic lift. Models are available with capacities of 2000, 3000, and 4000 pounds.

(Line of fork trucks is manufactured by The Elwell-Parker Electric Co., Dept. CP, Cleveland 3, Ohio . . . or for more information check 7544 opp. last page.)

*Modernizing Conveyor Lines?*

**CHECK Weld-Bilt  
STEEL-BELT CONVEYORS**



Custom-engineered to your exacting needs, Weld-Bilt "moving belts of interlocking steel — or stainless steel" offer profitable advantages. Positive tracking, they cannot weave, buckle, stretch or creep. Friction-free, they run on ball bearing rollers, from positive slip-proof motor drive. And, best of all, they offer *unlimited life*.

**"Weld-Bilt"**  
PRODUCTS

Call a Weld-Bilt engineer to help you plan new conveyor lines — or other modern materials handling equipment. Just drop a note.

**WEST BEND EQUIPMENT CORP.**  
MATERIALS HANDLING ENGINEERS

322 WATER STREET, WEST BEND, WISCONSIN

When inquiring check 7545 opposite last page

**aero**

RUBBER  
CUSHIONED

5-6½- and 13 gallon

**HERCULES**

CORK CUSHIONED

5-6½- and 13 gallon

**ARMSTRONG**

CORK CUSHIONED

5-6½ and 13 gallons

**CARBOY  
BOXES**

Treen manufactured 5 — 6½ — and 13 gallon carboy boxes are quality built in accordance with ICC regulations, with features that give all-point protection; reducing hazards and breakage, ease in handling and compact loading. Available with either "A" Hood or Export Hood.

**WRITE FOR  
COMPLETE DATA**

"Aces in Cases" FOR OVER 50 YEARS

**TREEN BOX COMPANY**  
TIOGA AND MEMPHIS STS., PHILADELPHIA 34

When inquiring check 7546 opposite last page

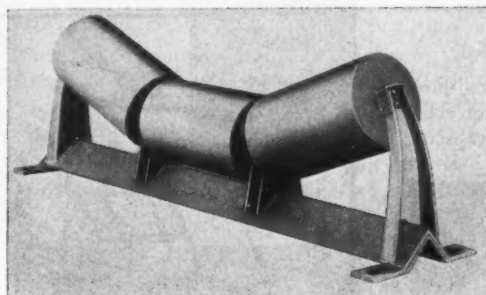
CHEMICAL PROCESSING

**Welded construction assures accurate alignment of rolls . . .**

Idlers are available with greasable or factory-sealed bearings

**Uses:** Idlers are for use with belt conveying systems.

**Features:** Rolls consist of outer shell plus steel center tube. Tubes are brazed to dish-shaped steel heads forming moisture-tight integral unit.




Brackets and foot straps are welded to inverted angle base, eliminating bolts or hardware

**Description:** Units are available with greasable bearings, with a "one shot" lubrication system serving all three rolls at once, or with factory-sealed bearings requiring no further lubrication. Steel brackets and foot straps are welded to inverted angle base, eliminating bolts that might shear or loosen. Slotted mounting holes permit positioning of idler to compensate for support structure variations, allow for training of belt.

Units are available for seven belt widths from 14 to 36 inches.

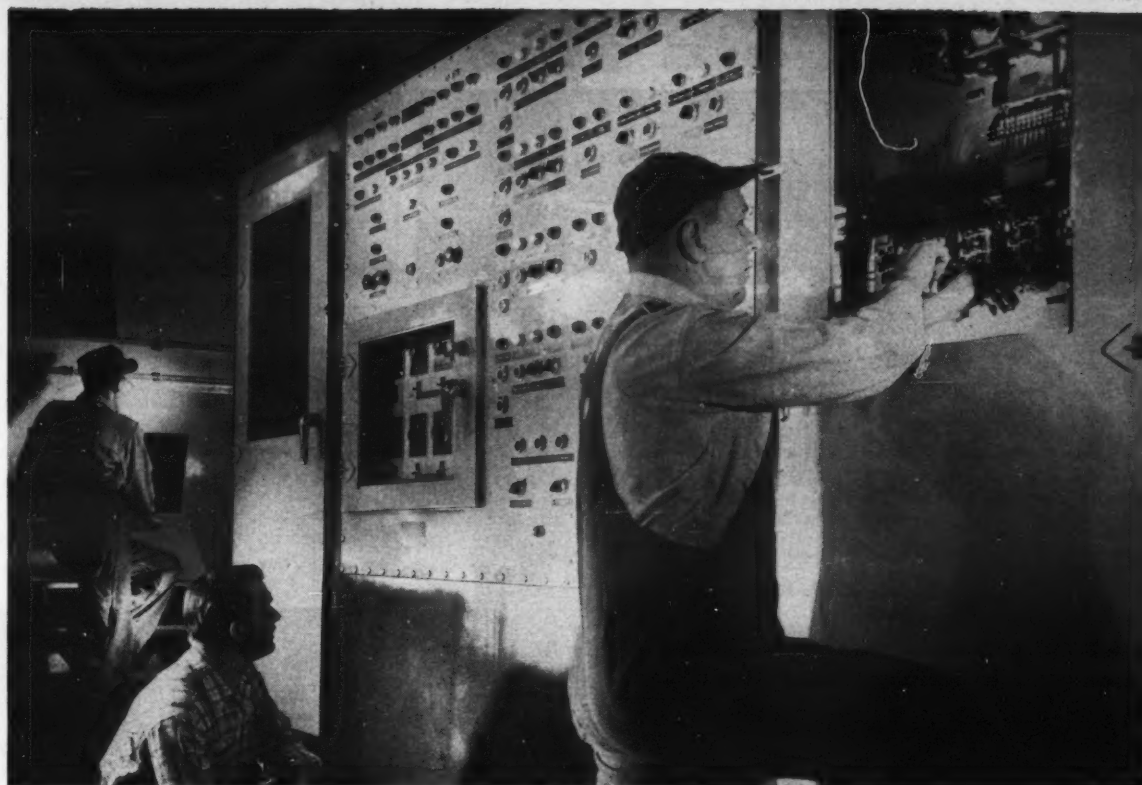
(Series 50 Belt Conveyor Idlers are manufactured by Link-Belt Company, Dept. CP, 307 N. Michigan Ave., Chicago 1, Ill. . . . or for more information check 7547 opposite last page.)



**Top-heavy reading load?**

Keeping tabs on latest developments in our fast-moving industry is a chore. **CHEMICAL PROCESSING** speeds your task with its unique format and sectionalization, and terse to-the-point articles.

Read how on page 100.



## Worked to death... to insure the life of your proportioning system

If there's anything worth its weight in gold in a proportioning system control panel, it's *dependability*. Before a single electrical component was designed into this panel being wired at Richardson Scale Co., its prototype had been literally worked to death in a controlled testing operation. It's survival of the fittest . . . and only the fittest is acceptable. Richardson's reputation as a producer of dependable control panels rests, in the last analysis, on the selection of tested components and on intensive and varied experience in applied electronics.

In addition, Richardson supplies each control panel

completely wired and pre-tested, invites the customer to familiarize himself with it *before installation* and takes responsibility for complete system operation. Detailed instructions and diagrams are supplied for each job.

But this is only part of the story. The best of control panels will not pinch-hit for a poor automatic weighing unit, mis-applied materials feeding equipment or improper storage bin design. Richardson know-how in this field embraces 50 years of experience in handling over 400 materials.

When it comes to proportioning, you're in good company when you come to Richardson. Look at some of the others who now have proportioning by Richardson:

The Firestone Tire & Rubber Company • General Foods Corp.  
General Electric Company • U. S. Bureau of Mines  
Reynolds Metals Company • American Rice Milling Co., Inc.  
Union Carbide & Carbon Corporation • Ford Motor Co.  
Fleischmann Distilling Corp. • The Flintkote Company  
Johnson & Johnson • National Distillers Products Corp.  
Owens-Illinois Glass Co. • Pittsburgh Coke & Chemical Co.  
Celanese Corp. of America • Goodyear Tire & Rubber Co.  
E. I. Du Pont de Nemours & Co., Inc. • and many more.

# Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

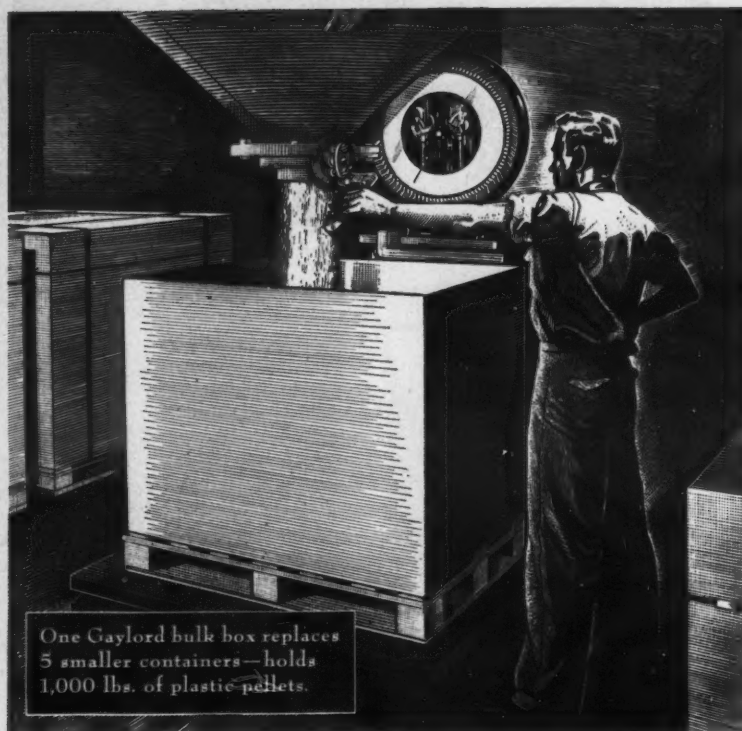
**RICHARDSON SCALE COMPANY**  
Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit  
Houston • Memphis • Minneapolis • New York • Omaha  
Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal  
Toronto • Havana • Mexico City • San Juan

Richardson Scales S.A. 1-3 Rue de Chantepoulet,  
Geneva, Switzerland

When inquiring check 7548 opposite last page





One Gaylord bulk box replaces  
5 smaller containers—holds  
1,000 lbs. of plastic pellets.

## SIMPLE ARITHMETIC IN PACKING

*When one large box does the work of several smaller ones . . . it adds up to savings in many directions. You pack your product faster, handle it more efficiently and store it in less space.*

*"King-size" Gaylord boxes are designed to hold as much as 2,000 pounds of such diverse products as bulk chemicals, metal parts, wax, and brake linings. The list is constantly growing. Your product could be next.*

*For any type of corrugated or solid fibre container to make your shipping more efficient, contact your nearby Gaylord office.*



CORRUGATED AND SOLID FIBRE BOXES  
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES  
KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION • ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check 7549 opposite last page

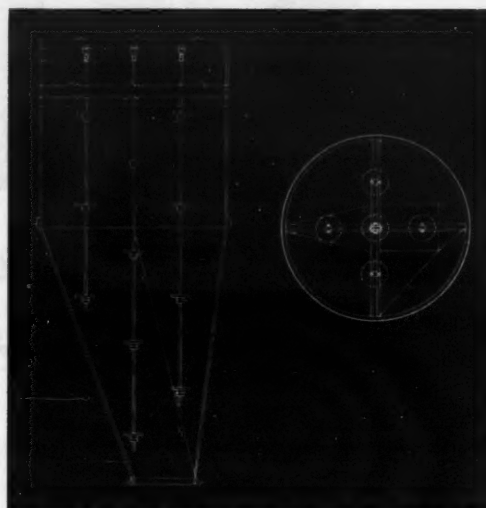
## MATERIAL HANDLING

### Bin contours and discs combine to minimize bridging

Units are assembled with bolts; capacity can be increased with added sections

Suspended at strategic locations within bin, anti-bridging discs aid material flow and prevent product bridging. Material flow is also assisted by bin design. One side of hopper is nearly perpendicular to discharge, while the other plane is a cone, pitched to best accommodate material handled.

Built and shipped in easily erected sections, bins require no field riveting or skilled labor for erection. They are assembled with bolts, and capacity



Suspended discs located within bin aid material flow and prevent product bridging

can be increased by addition of extra sections. If desired, units can be disassembled and moved to different locations.

Storage bins are available in sizes from 3 to 14 feet in diameter to 100 feet high. Fire and vermin-proof, bin walls cannot flake or contaminate material. Flush-joined, smooth interiors are free of obstructions which might hamper flow of product.

Heavy steel plate fins located on hopper carry entire weight. Reinforced standing seam construction adds rigidity and strength to entire height of body. Twin-screw feeders, air lock rotary valves, rack and pinion gates, or other discharge accessories are available for units.

(Bulk storage bins are manufactured by The Day Company, Dept. CP, 810 Third Ave., NE, Minneapolis 13, Minn. . . or for more information check 7550 on form opposite last page.)

SAFE • CONVENIENT  
DURABLE • LOW COST

### BALLYMORE SAFETY-STEP LADDERS

FROM 1 TO 8  
STEPS



Ladder rolls easily on large rubber ball-bearing casters

Casters retract under user's weight, legs grip floor firmly

Ballymore Safety-Step Ladders are available in a wide variety of sizes and models to meet working-height requirements up to 11'6". They are easily moved on rollers, but with no danger of "kick-out."

Made of all-welded  $\frac{3}{4}$ " steel tubing for maximum strength. Rust-resistant aluminum coating gives a durable, attractive finish. Handrails, optional on 2- through 8-step models, help eliminate fear of accidents. Three treads available: expanded steel, grip steel lath, and rubber-clad steel plate.

Write for specific information to Ballymore Company, Wayne 10, Pa.

**BALLYMORE  
LADDERS**



When inquiring check 7551  
opposite last page

CHEMICAL PROCESSING

**Guided by electronic signal,  
robot truck pulls  
three tons . . .**

guide wire is imbedded in concrete or may be taped to floor

Industrial tractor, requiring no operator, is guided by wire imbedded just beneath surface of warehouse floor. Wire emits electronic signal which is sensed by guidance receiver on tractor—guiding it left or right and controlling starting and stopping. Guide system may also be installed by taping wire to floor or stringing it overhead.

There is no physical contact between wire and tractor. Signals are picked up by receiver mounted on tractor. These signals control all movement of tractors and trailers.

Working in an undeviating path, unit can pull up to 6000 lb of freight. Not only does unit relieve



Unit is controlled by signal from guide wire — guiding it right or left and controlling starting and stopping

man-power for other duties, but eliminates danger of tractor's running off course.

Unit has top speed of over six mph and is equipped with hand controls for conventional operation when desired.

(Guide-O-Matic tractor is manufactured by Barrett-Cravens Co., Dept. CP, 628 Dundee Road, Northbrook, Illinois . . . or for more information about manufacturer's product, reader may simply check 7552 on the convenient Reader Service slip which is located opposite last page.)

## Ouija boards are passé



Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course . . . but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA\* the publisher is taking an important step toward sound and accurate planning in your behalf. It means that he is checking, double-checking and constantly rechecking —

- Who you are
- Where you work
- What your job is

He wants and needs this information — and the BPA\* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- Editorials that will help you in your work
- Advertising that will have value to you

He can serve you even better if you will complete surveys and questionnaires which he may send you, and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA\* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of a publication is audited by . . .

**\*BUSINESS PUBLICATIONS  
AUDIT OF CIRCULATION, INC.**  
420 Lexington Avenue New York 17, N. Y.

# BPA

A Non-Profit, Tripartite Membership Corporation of Advertisers, Advertising Agencies and Business Publications



## PLATING ACIDS

Safely Floor-Drained

with

**Chemi-Drain**

CHANNEL PIPE

This Chemi-Drain system was installed for handling waste, overflow, washdown, and reclamation of highly corrosive plating solutions at a Flint, Michigan, automotive parts factory. Construction time was cut by more than 25%, compared with hand-laid acid brick channels in the same plant. Chemi-Drain comes in convenient three-foot sections—makes acid-proof channels of any depth from 4" to 12". For full details, write: The Logan Clay Products Co., Box 698J, Logan, Ohio.

DISTRIBUTOR INQUIRIES INVITED

*first*  
TO GUARANTEE  
NOW EXTENDED  
TO 75 YEARS

**LOGAN**  
ESTABLISHED 1890

LC-556-B

THE LOGAN CLAY PRODUCTS COMPANY • BOX 698J • LOGAN, OHIO

When inquiring check 7553 opposite last page

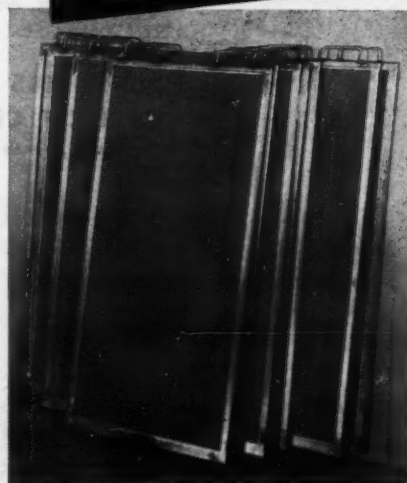
## New "RIM-LOK" Filter Leaf

Low Cost,  
Simple Design for  
All Types of  
Pressure Filters

- 1—Provides simple closure of metal filter cloth in leaf frame without use of rivets, bolts or solder.
- 2—Smooth surface of frame facilitates scraping of cake.
- 3—Frame cannot open up or distort even when hammered.
- 4—Rugged draining baffle is lightweight, easy to inspect.
- 5—Generous filtrate drainage capacity.
- 6—Uniform precoating, even on largest leaves.
- 7—Made of any commercial alloy, and with filter cloth of any required mesh.

Send for RIM-LOK bulletin.

by **MULTI-METAL**



**MULTI-METAL WIRE CLOTH CO., INC.**  
1356 GARRISON AVENUE NEW YORK 59, N. Y.

When inquiring check 7554 opposite last page

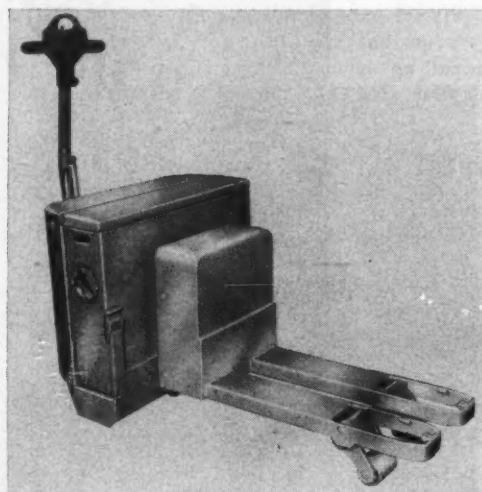
## MATERIAL HANDLING

**Can be controlled with handle  
in any position — operates  
in narrow aisles**

**Uses:** Walkie truck is designed for handling tin plate pallets and skid platforms in narrow aisles.

**Features:** All controls — forward and reverse, power lift and lowering, brake and horn — are located in handle head. Controls operate with handle in all positions including vertical, saving up to 12" of aisle space.

**Description:** Unit is made in capacities of two or three tons and has outside fork width of 16 inches (two ton) and 17 inches (three ton).



Unit operates with handle in any position — saving up to one foot of aisle space

Clearance between lifting forks is four inches, allowing truck to straddle center stringer of pallet. Forks are available in lengths up to 48". Forks have lowered height of 3 1/4" and lift of 4".

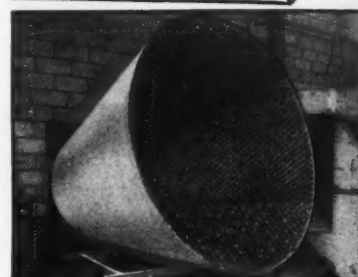
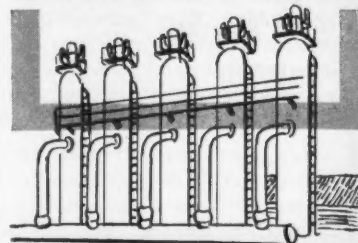
(Truck is manufactured by Lewis-Shepard Products, Inc., Dept. CP, 193 Walnut St., Watertown, Mass. . . . or for more information check 7555 on form opposite last page.)

**Describes line of transports  
for chemicals and liquids**

Four-page bulletin, printed in two colors, describes line of highway transports and lists materials currently being handled in highway trailers. Bulletin includes check list for noting trailer requirements for preliminary cost estimate.

Bul TT-56211 is issued by The Heil Co., Dept. CP, Milwaukee, Wis. When inquiring specify 7556 on form opposite last page.

## FEWER "TURN-" AROUNDS



Shutdowns for repairs of fire clay linings in refractory units are expensive. The frequency and duration of these shutdowns can be greatly reduced by the use of a steel grating armor known as "Gridsteel", which holds the castable refractory linings in place longer and armors them against the bombardment of catalytic elements.

"Gridsteel" is available in a special loose clinch to conform easily to curved surfaces.

For complete information,  
write for brochure on  
Irving "Gridsteel"  
Contour Retainer Mesh



"A Fitting Grating  
for Every Purpose"

**IRVICO**

**IRVING SUBWAY GRATING CO., Inc.**  
Originators of the Grating Industry

Offices and Plants at  
5050 27th St., LONG ISLAND CITY 1, N. Y.  
1850 10th St., OAKLAND 23, CALIFORNIA

When inquiring check 7557  
opposite last page

CHEMICAL PROCESSING

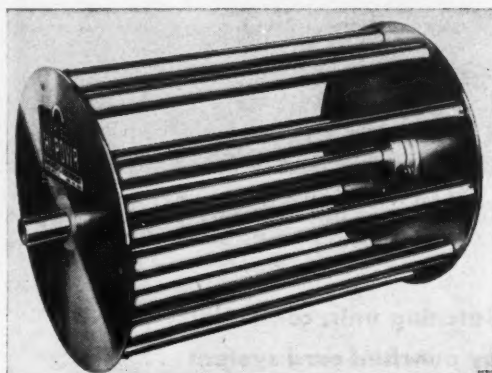
**Removes tramp-iron,  
stops bridging . . .**

rotating, magnetic unit designed for installation at discharge chute

**Uses:** Magnetic separator removes tramp-iron or fine ferrous particles from cohesive materials such as gypsum, barium carbonate, cohesive chemicals, wood flour, and various fibrous materials.

**Features:** Mechanical action of unit's rotation prevents clogging or bridging of material in chutes or ducts.

**Description:** Rotating separator is composed of multiple stainless steel Alnico V tube magnets mounted horizontally between stainless plates. Entire assembly rotates around central shaft. This



Rotating unit prevents bridging of material while collecting tramp-iron and small iron particles

extends beyond end-plates sufficiently to accommodate drive pulley and permit installation of unit in flange or pillow-block bearings. In operation, unit revolves through flow of material at predetermined speed relative to nature and condition of material. Under excessive choke conditions, separator will deliver optimum magnetic separation at a slow 5-10 rpm. Top speed of 30 rpm will generally not be exceeded. For best results, a speed of 15-20 rpm is recommended.

(Rota-Grate is manufactured by Eriez Manufacturing Co., Dept CP, Erie 6, Pa. . . or for more information check 7558 opposite last page.)

**Gas-electric fork truck**

Four-page, two-color booklet describes features and operations of gas-electric powered industrial lift trucks.

Bul 6005A is issued by Automatic Transportation Co., Div. of Yale and Towne, Dept. CP, 149 W. 87th St., Chicago 20, Ill. When inquiring specify 7559 on form opposite last page.

***For uniform flow of materials,  
regardless of surges . . .***



These three Link-Belt FLEXMOUNT Oscillating Conveyors are installed at a Michigan salt refinery. Each of the two partitioned units handles three grades of salt.

**choose LINK-BELT  
FLEXMOUNT  
Oscillating  
Conveyors**

WHETHER your material is fed in a trickle or in sudden surges . . . a Link-Belt Flexmount Oscillating Conveyor smooths it out into a uniform, continuous flow at selected speeds. Its "Positive Action" is so gentle that a cigarette ash can travel the entire length intact.

Flexmount is compact, flexible . . . ideal for conveying hard-to-handle materials. Leakproof, one-piece troughs can be divided to convey two or more materials simultaneously . . . and can be made dust- and gas-tight. In addition, pre-engineered sections can be bought "off-the-shelf" for low-cost on-the-job assembly. They're available from stock in 8-, 12-, and 18-in. widths from your Link-Belt factory branch store or authorized stock-carrying distributor.

14,208

**LINK-BELT**  
FLEXMOUNT OSCILLATING CONVEYORS

**Only FLEXMOUNT gives you these 8 big advantages**

● **POSITIVE ACTION.** Assures smooth, continuous flow regardless of load. Natural spring action minimizes horsepower requirements.

● **COMPACT.** A "natural" for restricted space. Space-saving design permits easy installation.

● **LOW MAINTENANCE.** Operates at low speed. Only the drive needs lubrication.

● **SELF-CLEANING.** No crevices, joints or pockets to cause build-up of material. Prevents contamination.

● **FLEXIBLE.** Various widths, standard lengths up to 100 feet . . . for a few pounds or many tons per hour.

● **LONG LIFE.** Few moving parts. No joints or bearings in contact with material. Resilient legs last indefinitely.

● **SAFE.** Conveying trough has no moving parts. One-piece construction protects product and personnel.

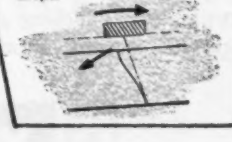
● **VERSATILE.** Handles dry, wet, powder, granular, hot or cold materials and many other forms. Ask for recommendations.

**Here's How  
"POSITIVE ACTION"  
moves your  
material**

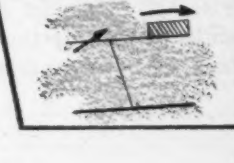
1. Rotation of eccentric drive moves pan and bed of material upward and forward.



2. On downward-backward stroke, pan drops from bed . . . material moves ahead and drops.



3. Ensuing upward-forward movement of pan catches material and moves it ahead.



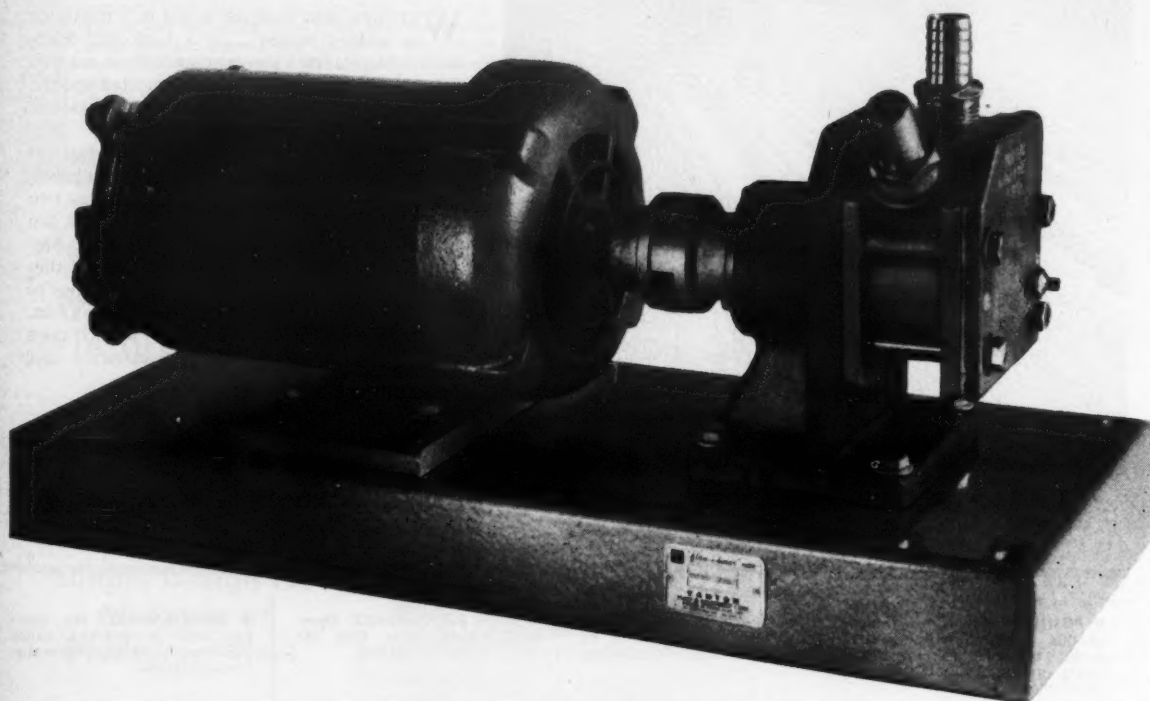
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 7560 opposite last page



VANTON "flex-alloy" stainless steel rotary pump

# the one *(and only) stainless steel rotary pump without stuffing boxes or shaft seals!*



Here is a stainless steel rotary pump that is really different! The unique "flex-i-liner" design eliminates stuffing boxes, shaft seals, gaskets or check valves. It limits fluid contact to the stainless steel housing and the durable plastic or rubber flexible liner, making the "Flex-Alloy" ideal for the toughest corrosives and abrasive slurries.

"Flex-Alloy" pumps are self priming, and their gentle pumping action permits safe handling of shear sensitive emulsions and suspensions. Pump

units are available in capacity ratings from  $\frac{1}{8}$  to 20 gpm and can be furnished direct connected to constant or variable speed motor equipment. Vacuums up to 26" of mercury are developed.

**Housings:** Regularly furnished in type 316 stainless steel. Other alloys are available on request.

**Linings:** Available from stock in Neoprene, Buna N, gum or natural rubber, Hycar, Hypalon, Silicone, Vinyl or Compar.



Bulletin VP561 on request

## VANTON

PUMP & EQUIPMENT CORP.

division of Cooper Alloy Corporation HILLSIDE, N.J.

When inquiring check 7561 opposite last page

## MATERIAL HANDLING



For any required batch operator simply inserts punch card in slot. This automatically controls weighing apparatus, gates and valves

**Batching unit, controlled by punched card system . . .**

## SELECTS BATCH COA AND WEIGHTS—AUT

Applying speed and accuracy of electronics to commercial weighing units, system selects components and weights for batching using punched cards. Housed in a console no larger than a standard filing cabinet, unit automatically selects and weighs out precise amount of any number of materials. Combinations of material weights and selections are unlimited and can be changed instantly.

To operate, punched card is inserted in slot on console. This automatically selects proper components and weights. Where repetitive batches are required, unit provides for recycling. Simple control on console compensates for moisture content of dry materials. Unit, designed specifically for commercial and indus-



All major components are unitized for ease of maintenance. Units are mounted on free sliding drawers that can be replaced quickly

## CH COMPONENTS S— AUTOMATICALLY

trial applications, has closed circuit that reduces possibility of malfunction due to vibration, moisture or dust. All major components of console are grouped and set on individual drawers which can be quickly removed, or mounted on panels that swing into position for easy maintenance.

Push buttons for all controls provide for manual batching of individual materials. Typical applications of units include chemical batching, fertilizers, concrete components and refractory material.

(Helco-matic Batchmaster is product of The Heltzel Steel Form and Iron Co., Dept. CP, Warren, Ohio . . . or for more information check 7562 on form opposite last page.)



## 2,048 Tons per Day

Chemical and fertilizer plants far and wide report exceptional satisfaction with the performance of the new "PAYLOADER" models. They not only handle more tonnage than earlier "PAYLOADER" machines, but are way ahead of other front-end loaders in design and the features which make them MORE PRODUCTIVE.

Whether you have a large-tonnage application like the one pictured\*, a boxcar unloading need, or applications in between—indoors or outdoors—there is a "PAYLOADER" size to fit your requirements. And there is a nearby Hough Distributor with complete sales-service facilities ready to work with you.

*\* A 4-wheel-drive "PAYLOADER" with 2 cu. yd. bucket loading trucks with 256 tons of sulphur per hour.*

**Dig More**—Powerful 40° bucket tip-back at ground level gets heaped loads quickly and easily with less spillage loss.

**Carry More**—Low, close load-carry position, plus hydraulic load shock absorber permit carrying more at higher speeds.

**Deliver More**—Since they get more to begin with and can carry more—at higher speeds—they deliver more tonnage, at lower cost.

**THE FRANK G. HOUGH CO.**  
744 Sunnyside Ave., Libertyville, Ill.

- ☐ Send data on Model HA (18 cu. ft.)
- ☐ Send data on Model HAH (1 cu. yd.)
- ☐ On larger models up to 2 1/4 cu. yd.

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_



**PAYLOADER®**  
MANUFACTURED BY  
**THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.**  
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



When inquiring check 7563 opposite last page



# SAFE

moisture and fume  
removal



Three outstanding features make Air-Van Power Exhausters especially suited for exhausting moisture and corrosive fumes.

Direct Drive  
150 to 11,000 CFM.  
S.P. to 4".

- A patented scroll design assures positive air removal. Gallaher Air-Vans are designed to handle up to 65,000 CFM at static pressures to 4".

- The motor is out of the air stream.

- A patented air seal-off protects the motor by creating a constant curtain of fresh air around the motor shaft. This prevents any fumes from entering the motor housing.

- Other Air-Van features include quiet operation, low silhouette, weather-proof design, availability in special metals and finishes and certified ratings based on actual physical tests.

Patents 2188741. 2526290  
Patents pending

## The GALLAHER Company

4108 Dodge Street

Omaha, Nebraska

Export Office: 306 Paul Bldg., Utica 2, N.Y. Cable "Keiserquip"

When inquiring check 7564 opposite last page

## POSITIVE PROOF of PRACTICAL SAFETY



Type 2 Safety Cans (above) minimize risks in pouring, permit faster filling of portable power units, etc. Labeled Underwriters' Laboratories and Factory Mutuals.



Justrite Plunger Cans for safe dispensing of flammables for cleaning, sponging, etc., are available in 3 sizes. FM approved.

Justrite Approved Safety Cans on the job in your plant are evidence of safe practice, economy and efficiency. Easier handling and pouring of flammables, conservation of costly solvents, lower insurance charges, less replacement; all are your dividends wherever Justrite Cans are used.



Type 1 Safety Cans available in 7 sizes (one pint to 5 gallons) store safely, pour easily. FM approved. UL labeled. Type 1 Cans also available hot tin dipped or in stainless steel.

Send for JUSTRITE's New 50th ANNIVERSARY CATALOG.

Save Money — see the complete Justrite line in new 16 page full color catalog. Get the full story before you buy any safety cans, lights or other equipment.

**JUSTRITE MFG. CO.**

2061 N. Southport Ave., Dept. CP  
Chicago 14, Illinois

When inquiring check 7565 opposite last page

## safety

Aluminum-coated fabrics, reflecting radiant heat

instead of insulating against it, permit fire-fighters to . . .

## WITHSTAND TEMPERATURES AS HOT AS THE



Armful of logs bursts into flame in intense heat. Wearer feels no heat except that from his own body

Protective clothing, constructed of fabrics with metallic coatings, can now allow workers to enter areas at temperatures to 1200°F . . . one-eighth as hot as the sun's surface.

Shown at a recent demonstration, the fabrics, of cotton duck, asbestos, or glass fiber, protect the man inside by reflecting radiant heat instead of insulating against it. This permits much less bulky insulation so that a man can move and work at temperatures higher than ever before in repair, inspection, rescue, or fire-fighting operations.

The suit was demonstrated in a ceramic

furnace where temperatures of 1200°F could be maintained. Suit's wearer entered the furnace six times . . . and each time stayed two or three minutes as if on a rescue or repair mission.

Suit demonstrated, of metallic coating on glass fiber fabric, backed up by glass fiber quilting, has been worn into temperatures as high as 1400°F with no heat felt by the wearer. Nine-tenths of the heat is reflected away by the aluminum and the little that gets through is dissipated by the insulation layer. The only heat felt by the wearer is

RES  
THE

## ONE-EIGHTH SUN'S SURFACE

that from his own body.

(Aluminized fabric for suit is manufactured by the Minnesota Mining and Manufacturing Co., Dept. CP, 900 Fauquier Street, St. Paul 6, Minn. . . or for more information check 7566 on the convenient Reader Service slip which is located opposite last page.)

(Suit demonstrated was manufactured by Fyrepel Products, Inc., Dept. CP, Newark, Ohio . . . or for more information check 7567 on form opposite last page.)



Protective suit is constructed of aluminum-coated glass fiber, backed up by glass fiber quilting. Clothing enables wearer to perform rescue or repair missions at temperatures up to 1200°F safely



## BIFURCATOR<sup>®</sup> FAN

**key to your corrosive  
fume removal problems**

BIFURCATOR is the divided-housing fan backed by 30 years experience in design and application.

Ideal for corrosive, high temperature and hazardous fume removal from:

- |                       |                      |
|-----------------------|----------------------|
| CERAMIC KILNS         | FOUNDRIES —          |
| CERAMIC PLANT         | SHAKE-OUT AREAS      |
| INSTALLATIONS         | FURNACES             |
| CHEMICAL PLANT        | GLASS PLANTS         |
| INSTALLATIONS         | LITHOGRAPHIC OVENS   |
| CHEMICAL LABORATORY   | LUMBER DRYING KILNS  |
| HOODS                 | METALLURGICAL PLANTS |
| CORE BAKING OVENS     | METAL PICKLING VATS  |
| DRYING OVENS          | PAPER MILLS          |
| DYE HOUSES            | SLASHERS             |
| ELECTROPLATING TANKS  | STRIPPING TANKS      |
| FOOD PROCESSING OVENS | TEXTILE MILLS        |
| FOUNDRIES —           |                      |
| Pouring Areas         |                      |

Mail coupon today for free Catalog DB-37-55.

**DeBOTHEZAT FANS DIVISION, Dept. CPD-936**  
American Machine and Metals, Inc.  
East Moline, Illinois

- ☐ Send Bulletin DB-37-55 containing complete data on the Bifurcator for exhausting fumes.
- ☐ Have a DeBothezat representative call.

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

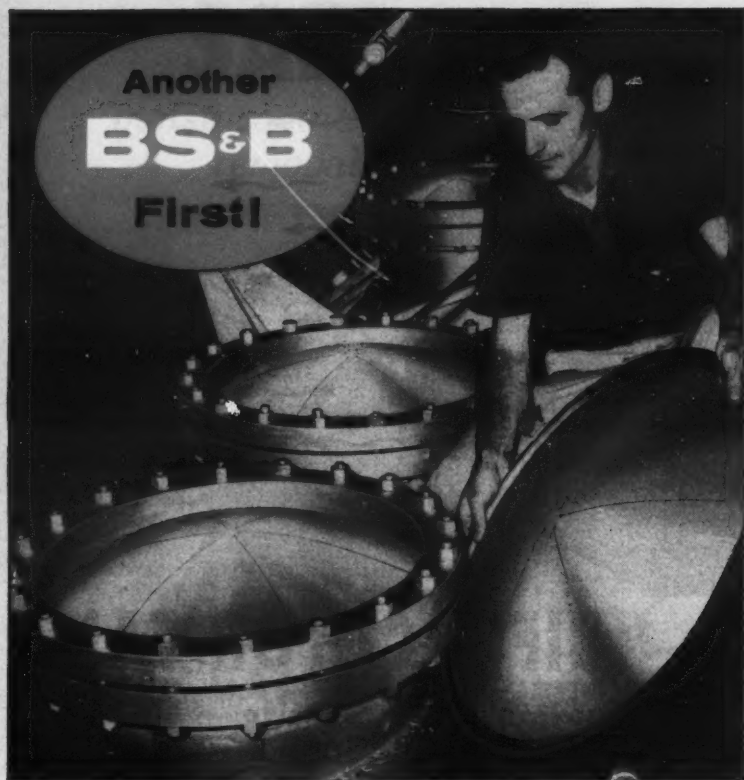
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

ATTENTION MR. \_\_\_\_\_

**De Bothezat FAN'S**  
A DIVISION OF  
**American Machine and Metals, Inc.**  
EAST MOLINE, ILLINOIS

When inquiring check 7568 opposite last page





Safety for an aircraft test facility at Pratt & Whitney Aircraft Plant, using BS&B Model DV Rupture Discs.

## BS&B SAFETY HEADS

### Now Handle Even "Tougher" Applications With The New Model DV Rupture Disc...

#### FEATURES OF THE MODEL DV DISC

- ✓ Unrestricted, Instantaneous Opening In Sizes 1" Through 36".
- ✓ Greater Safety — Operates Closer To Disc Rupture Pressure.
- ✓ Minimizes Metal Creep Due To Elevated Temperatures And Pressures.
- ✓ Pressure Ratings: 5 lbs. To Several Hundred Pounds.
- ✓ Temperature Ranges: Sub-Zero To 900° F.

#### USE BS&B SAFETY HEADS!

Utilize Our Research Facilities In Selecting Model DV Discs For "Tough" Applications.

**BLACK, SIVALLS & BRYSON, INC.**

Safety Head Division, Dept. 2-M9  
7500 East 12th Street Kansas City 26, Missouri



When inquiring check 7569 opposite last page

#### SAFETY

#### Sturdy safety glasses attractive to workers

Style is a factor in design of these safety eyewear frames. By making them attractive to workers, manufacturer overcomes resistance to wearing them.

Construction is of acetate butyrate and metal. Plastic parts are cured for toughness, will not



Frame is combination metal and plastic

burn under ordinary conditions. Metal bridge is plated and riveted in place. Nose pads can be either rigid or adjustable.

(Titan safety frames are made by Bausch & Lomb Optical Co., Dept. CP, 635 St. Paul St., Rochester, N.Y. Check 7570 on form opposite last page.)



"... yeah boss, 200 barrels a day. But let me finish. . ."

Irving Weissman of Shell Oil Company's Houston Refinery, sent us this idea.

#### For SAFETY FIRST Use . . .

## DAV-SON

Industrial Bulletin Boards

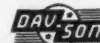
#### "The Safety Director"

Now get immediate attention with Red, Green, and White Colorful Safety First Signs flashing safety messages from all strategic plant locations. Light, Color, and Motion combine to give the most effective safety bulletin made.



#### QUICK CHANGE LETTER

BOARDS for any message you want, when you want it. Get quick acceptance of plant programs, safety news, etc. Flash BIG, Bold Headlines on durable economical changeable letter boards. Many sizes, styles available.



**A.C. DAVENPORT & SON, INC.**

ESTABLISHED 1932

311 N. DESPLAINES ST., CHICAGO 6, ILL.

MANUFACTURERS OF BULLETIN BOARDS FOR EVERY NEED

When inquiring check 7571 opposite last page



Genuine Cork-Back boards with amazing self-sealing cork for quick posting of letters, photos, posters, etc. Walnut finish hardwood frame, mitered and glued corners, or sturdy metal frames. Available with or without locking glass doors. Wide variety of sizes. Also with or without fluorescent illumination.

We are manufacturers of bulletin boards for every purpose. Changeable letter directories, production control, sales bulletin boards, organizational charts and special display boards of all types.

#### CONSULT US

## HOW TO HANDLE DRUM FLUIDS faster!

#### WORKS DOZENS OF WAYS!

Handiest piece of equipment in the plant! That's what they say at scores of plants where this Fast-Flo Drum Pump is used. It's a really versatile worker... has dozens of specific uses. Here are just a few ways it will work for you:

- For transferring fluids cleanly and safely from upright original drums.
- For supplying or adding fluids to production lines, direct from original drums.
- For agitation and mixing in closed drums.
- For injecting fluids such as cutting oil at high pressure.
- For intermittent spraying of lacquers, varnishes and other light coatings.

Fast-Flo is surprisingly low in cost... air-operated... easy to handle... and rugged! You get double-action, high volume, controlled delivery, wherever you use it.

Write today for the new Fast-Flo Idea Book which tells you where and how this pump can save you money.

**GRAY COMPANY, INC.**  
92 Grace Square, Minneapolis 13, Minn.



**GRACO** *Fast-Flo*  
**DRUM PUMP**

Regional Offices: New York, Philadelphia, Detroit, Atlanta, Chicago, San Francisco

When inquiring check 7572 opposite last page

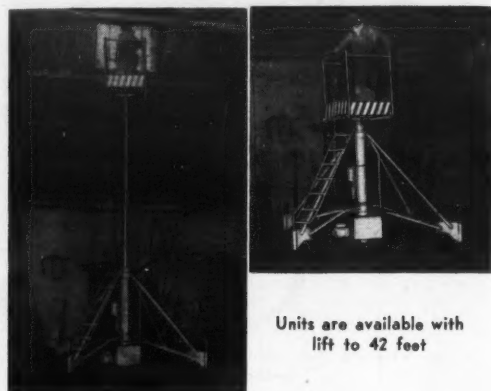
CHEMICAL PROCESSING

## Steadied with leveling jacks, lift elevates man to 42 feet

Unit folds to pass through doorways, into elevators

**Uses:** Lifts are designed for use in production as well as installation and maintenance.

**Features:** Maximum stability is provided by screw leveling jacks at each corner to hold lift in steady position. Swivel casters permit mobility.



Units are available with  
lift to 42 feet

**Description:** Designed for maximum extension up to 42 feet above floor level, hydraulically-operated lift folds to pass through doorways, narrow passages, in and out of elevators. A ladder provides access to platform in "down" position. Operator has complete control for raising, stopping and lowering by means of pushbutton control located on platform's guardrail. Area of platform is 2'3" by 2'3" . . . platform load is rated at 350 lb. Platform is equipped with three-foot guard rails and can be rotated through 360°. Made in six standard models, reach from 19 to 42 feet, units have 110 volt, 60 cy single-phase pump motor plus hand-operated pump where electric power is not available or when power shut-downs occur.

(Mobile Access Lifts are manufactured by The Ballymore Company, Dept. CP, Wayne 1, Pa. . . or check 7573 opposite last page.)

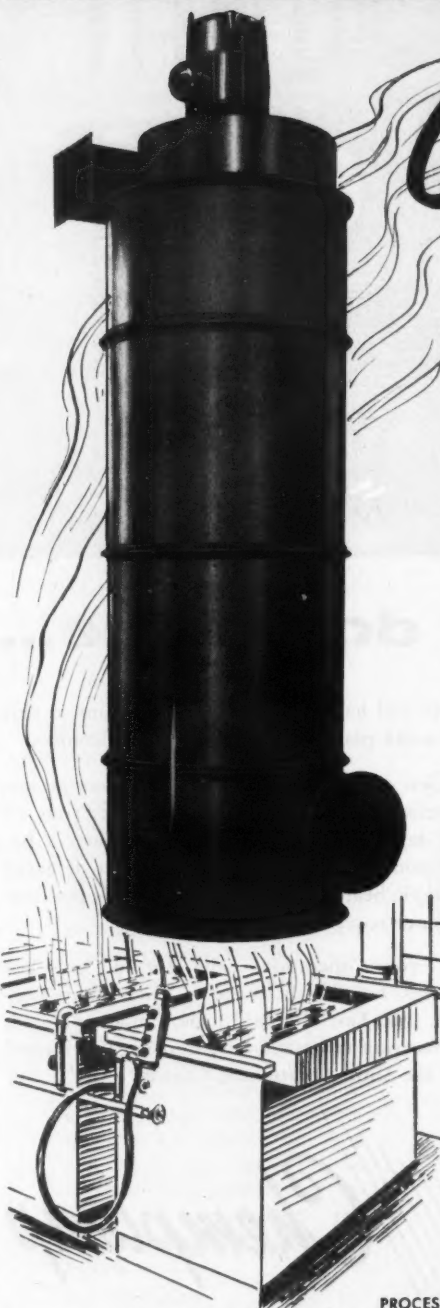
### For a guide to safety ideas . . .

You'll find what you need in the Product Directory on pages 261 to 264. All products and processes are listed there.

**NOXIOUS - CORROSIVE - ABRASIVE FUMES,**

**MIST AND DUST REMOVED MORE EFFICIENTLY,**

**MORE ECONOMICALLY BY THE...**



## Cyclonaire- FUME WASHER

If your plant has an air pollution problem it can probably be solved in less time—with less trouble—and for less expense than you realize. We're speaking of course, of the Cyclonaire . . . a new and highly effective departure from bulky, old fashioned "custom built" fume scrubbers. The Cyclonaire removes up to 99.9% of many gases in concentrations of 1% or less, and safely handles corrosive fumes in low concentrations. Yet for all its efficiency, it is much smaller in size (and less expensive), with relatively low power and water requirements. Since it requires little floor space it can usually be strategically located inside the plant. Installation can be handled by two men in four hours, or it can be disassembled and relocated in a comparably short time. It is made of steel in easily assembled flanged sections, and protected from corrosion by a 3/32" Tygon Lining on interior surfaces. Outside surfaces are protected by Tygon ATD Hot Spray Paint.

The Cyclonaire owes its superior efficiency in large part to its Intalox Saddle Tower Packing which: 1) provide more available gas liquid contact area, hence *more efficient scrubbing action*; and 2) insure greater randomness of packing with more void space through the bed, permitting *higher c.f.m. rates*. The Cyclonaire is sold as a "package" unit, complete with motor and Intalox Saddle Tower Packing. It is available in four standard models: 750, 1650, 3500 and 6000 c.f.m. (larger sizes on special order). Moreover, many variations are possible to meet virtually every requirement. For example: higher volumes can be handled by two units in parallel, or complete extra units can be strategically located throughout the plant. For total fume removal, additional packed sections are easily added, or two complete units may be used in series. For spray or dust elimination only, one or two packed sections may be omitted or packing volume reduced. Recycling equipment is also available for water or absorbent chemical liquids. These and many other variations can be quickly made at any time, using standard Cyclonaire components. Little or no involved engineering — and no special fabricating — is required in the majority of cases. But get the complete story . . .



250-E

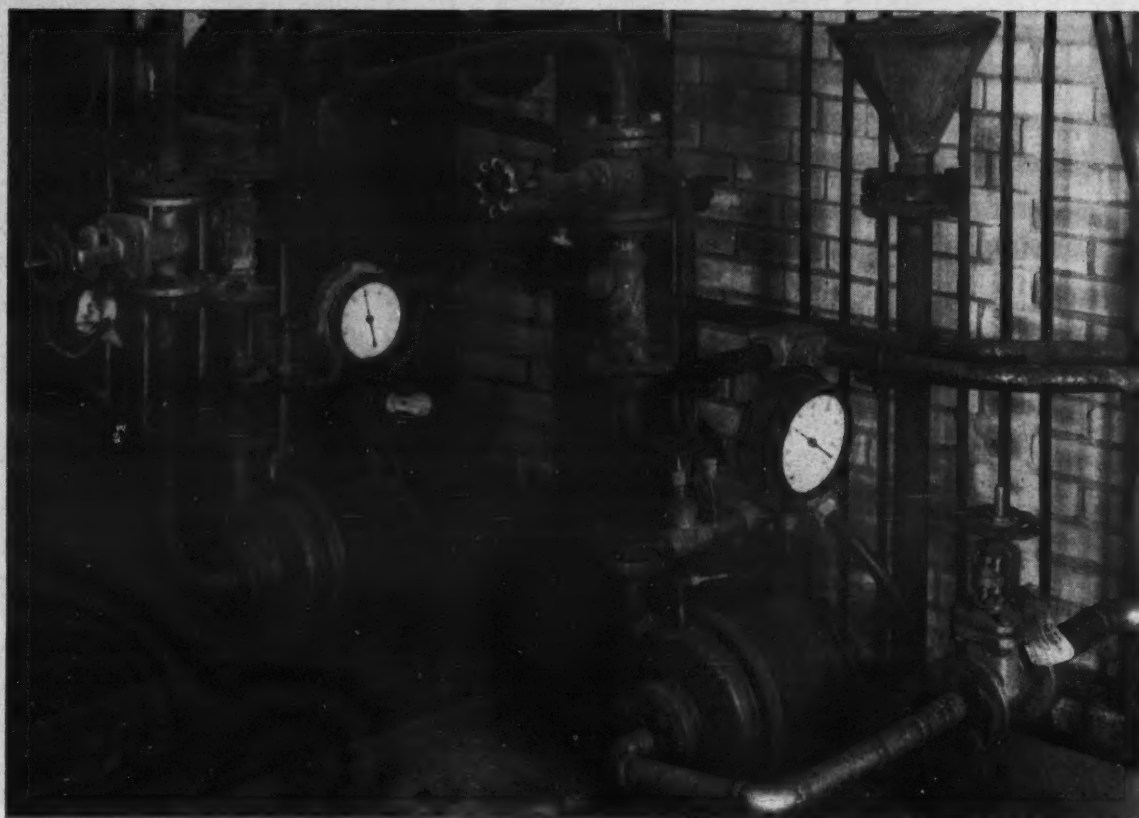
PROCESS  
EQUIPMENT  
DIVISION

**U. S. STONEWARE**  
AKRON 9, OHIO

Write for Bulletin FW-5, which presents complete, illustrated technical data.

When inquiring check 7574 opposite last page





## Canned pumps cut downtime...

### Leakproof Chempump helps avoid shutdowns at Publicker acetic acid plant

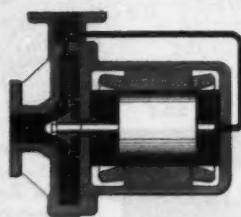
These two *Chempumps* are handling a mixture of alcohol, ethyl and propyl acetate and water . . . definite trouble makers for conventional centrifugal pumps. The men at Publicker say these pumps are doing a job that no other can handle.

Conventional centrifugals previously used couldn't hold this volatile, highly solvent mixture. Maintenance men had to tighten glands every few days, repack stuffing boxes twice a month. Leakage was

expensive and hazardous . . . and downtime at this 24-hour-a-day plant was a really serious problem.

Installation of these two Series C *Chempumps* was the solution. One pump, on feed service, runs 24 hours a day, seven days a week. The other, a by-product pump, runs four or five days out of every 14. A simple bearing change once a year is the only maintenance required.

Perhaps your operation calls for a seal-less *Chempump*. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



*Chempump* combines pump and motor in a single hermetic unit. No shaft sealing device required.

U. L. approved. Available in a wide choice of materials and capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

*Chempump*

First in the field...process proved

When inquiring check 7575 opposite last page

## SAFETY

### Vest-pocket instrument detects atomic radiation or X-rays . . .

unit weighs only two pounds — operates on flashlight battery

Lightweight instrument to detect and measure potentially hazardous nuclear radiation or X-rays is designed as a means to insure personnel safety. Simplicity of unit enables plant personnel to make



Unit, weighing two pounds, is powered by single flashlight cell

checks with minimum supervision from health physicist or industrial hygienist.

Unit, fitting into a suit coat pocket, weighs only two pounds and operates on an ordinary flashlight battery.

(Radiometer is a product of Curtiss-Wright Corp., Dept. CP, Wood Ridge, N. J. . . . or for more information check 7576 on form which is located opposite last page.)



### Safety banner for September

. . . is available in both indoor and outdoor types, both having same general message and multi-color design. Indoor type is of drill with grommets for easy hanging, while outdoor banner is of heavy duty drill with wind vents and has stitched-in rope. Both types are 10' x 40"

For information write National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill.

## Select The Right Glove...from PIONEER's Super-Market of Hand Protection



- A Stanzoil Black All Neoprene . . . . 7 sizes, 5 lengths, 3 weights
- B Stanzoil Red All Neoprene . . . . 3 sizes, 10 1/2" length, sheer wt.
- C Whitecap White All Neoprene . . . 3 sizes, 10 1/2" length, light wt.
- D Stanzoil White All Neoprene . . . . 7 sizes, 4 lengths, 3 weights
- E Stanzoil Knit-Lined Neoprene . . . . 5 sizes, 3 lengths, 2 weights
- F Stanzoil Flock-Lined Neoprene . . . 3 sizes, 10 1/2" lengths, light wt.
- G Pacemaker Black Neoprene Coated Flannel . 2 styles, 4 lgths., 2 wts.
- H Pacemaker Red Neoprene Coated Flannel . 3 styles, 3 lgths. 2 wts.
- I Stanflex Blue Plastic Coated Jersey . Full and Palm-Coat, 3 styles
- J Stanflex Knit-Lined Red Plastic . 4 sizes, 11" length, medium wt.
- K Sheergrip Natural Latex Rubber . . . 9 sizes, 3 lengths, sheer wt.
- L Sheergrip Green Latex Neoprene . . 7 sizes, 10 1/2" length, sheer wt.

### Mail This Coupon Today!

The PIONEER Rubber Co.  
241 Tiffin Road  
Willard, Ohio, U.S.A.

Please send me:

- ☐ The name of my nearest PIONEER Glove Distributor.
- ☐ 1956-57 PIONEER Industrial Glove Catalog.
- ☐ Hand Protection Clinic glove recommendation for job described in enclosed letter.

Firm \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Signed \_\_\_\_\_



## SAFETY

### One-way bandage doesn't stick . . .

bandage may be removed without pain or damage

Non-adherent, completely absorbent surgical dressing will not stick to wounds or burns, and keeps them entirely dry.

This dressing consists of a pad of highly absorbent, non-woven cotton material, bonded to a thin coating of finely perforated plastic. Discharge from wound passes through perforations and is absorbed by cotton material. Perforations function as "one-way valves" . . . discharge cannot flow back into wound. Dressings can be removed from wound without soaking, without pain, and without rupturing healed surfaces.

Dressings are available in form of 2 and 4" bandage compresses, and as an 8 x 10" compress.

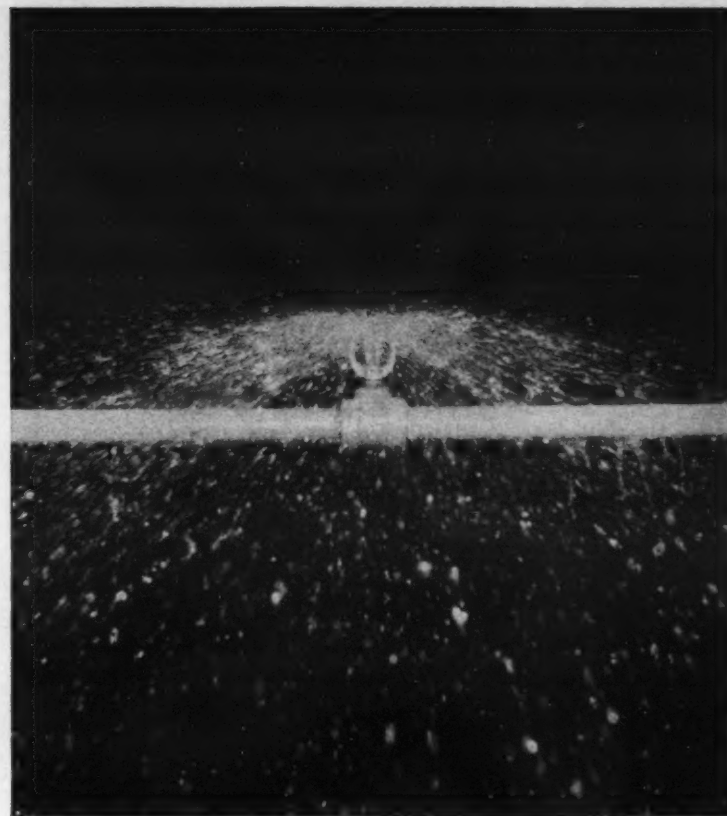
(Telfa Non-Adherent Dressing is available from the Davis Emergency Equipment Co., Inc., Dept. CP, Newark, N.J. Check 7578 opposite last page.)

### Inert gas generator analysis form

Eight-page, two-color booklet explains advantages and operation of inert gas generators for use in protection against fire and explosion hazards. In addition to detailed drawings, photographs, capacity and dimension tables, the book contains useful information sheet.

Ample space is provided for an analysis of work to be done by generator, operating conditions, utilities needed and other data necessary for selection and type and size of unit. Sheet can be removed from booklet and returned to manufacturer for complete recommendations and prices.

Bul IGG-155 is issued by Roots-Connorsville Blower Div., Dept. CP, Connorsville, Ind. When inquiring specify 7579 on form opposite last page.



## Fire Safety In Action . . .



You're looking at an "Automatic" SPRAY Sprinkler an instant after fire has triggered it into action. The deluge of water will snuff out a blaze before it has a chance to gain headway. Millions of these ingenious devices provide a 24-hour-a-day fire watch in tens of thousands of industrial, commercial and institutional buildings throughout the land.

You, too, should let "Automatic" Sprinklers serve as your personal fire department. They will afford you the best practical measure of fire safety with the least effort, expense and interference with your business operation.

Complete descriptive literature now available.

For data on "Automatic" Sprinkler systems, write for Bulletin 66.

For data on SPECIAL HAZARD Fire Protection, write for Bulletin 73.

## "Automatic" Sprinkler

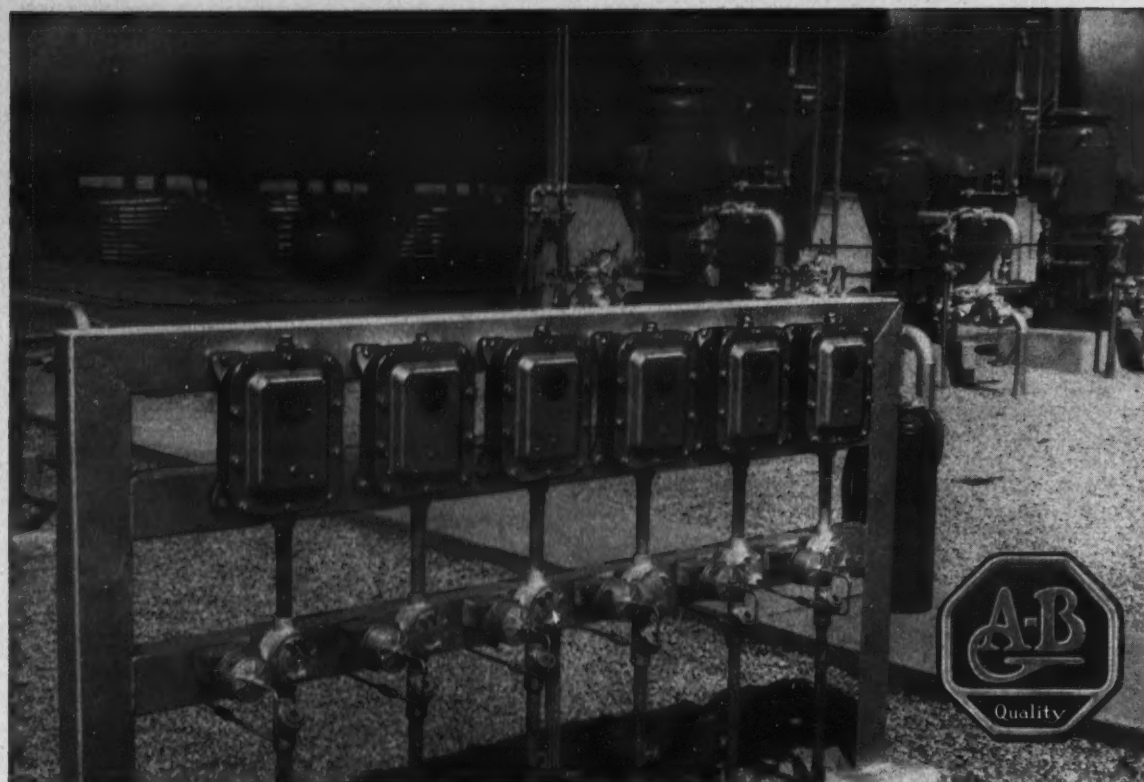
CORPORATION OF AMERICA  
YOUNGSTOWN, OHIO

Offices In Principal Cities of North and South America

When inquiring check 7580 opposite last page

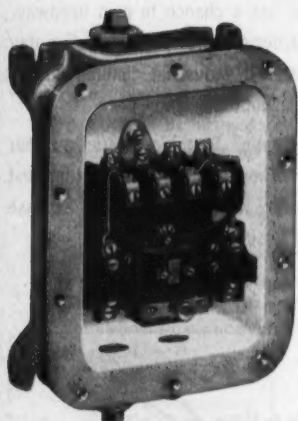
When inquiring check 7577 opposite last page





A row of six Allen-Bradley Bulletin 709 automatic explosion-proof starters on loading pumps of an L.P.G. processing plant

## FOR SAFE AUTOMATIC MOTOR OPERATION in Hazardous Locations *Specify* Allen-Bradley Explosion-proof Solenoid Starters



**Bulletin 709 Solenoid Starter**  
Allen-Bradley Size 1 solenoid starter in a NEMA Type 7 enclosure for operation in hazardous gas locations. The cover and base have wide machined flanges.

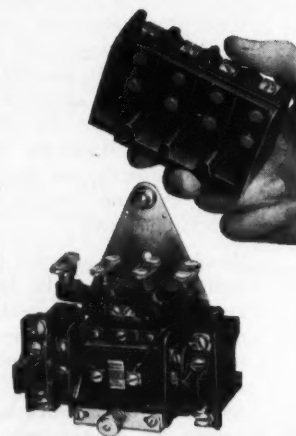
It takes a lot of maintenance time to open and replace bolted covers of explosion-proof starters. That's why it is important to specify Allen-Bradley solenoid starters . . . which are good for millions of operations without contact maintenance. The thermal overload relays can be reset without opening the enclosure.

Reduce your plant maintenance by using Bulletin 709 solenoid starters. You can install them . . . and forget them. Write for the Allen-Bradley Handy Catalog . . . a valuable guide for selecting motor controls and enclosures for every type of industrial service.

Allen-Bradley Co.

104 W. Greenfield Ave., Milwaukee 4, Wis.  
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

**ALLEN-BRADLEY**  
SOLENOID MOTOR CONTROL  
QUALITY



**Double Break, Silver Alloy Contact:**  
Arc hood lifted to show double break, silver alloy contacts on solenoid plunger and in arc hood. The basic solenoid design of all Bulletin 709 ratings is identical.

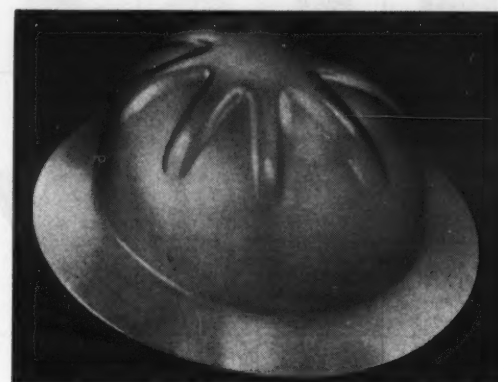
When inquiring check 7581 opposite last page

## SAFETY

**Six-point suspension, aluminum construction absorb impact of 40 foot-pounds**

**Uses:** Hat is designed to be worn in areas where injury might result from falling tools or material, or where low overhead clearance makes work hazardous.

**Features:** Six-point snap-end suspension spreads



Aluminum alloy headgear fits head sizes 6 $\frac{7}{8}$ -7 $\frac{5}{8}$

impact and absorbs shock. Hat withstands over 40 foot-pounds impact.

**Description:** Of ribbed aluminum alloy construction, hat fits head sizes from 6 $\frac{7}{8}$  to 7 $\frac{5}{8}$ .

(Aluminum safety hat is manufactured by Davis Emergency Equipment Co., Dept. CP, 45 Hallack St., Newark 4, New Jersey . . . or for more information reader may simply check 7582 on form which is located opposite last page.)

From the "My-mind-is-made-up-don't-confuse-me-with-facts" school? . . .

# NOTICE!

WHILE IN THIS OFFICE  
SPEAK IN A LOW, SOOTHING TONE  
AND

DO NOT DISAGREE WITH ME IN ANY MANNER

Please be informed that when one has reached "my age" NOISE and NON-CONCURRENCE cause gastric hyper-peristalsis, hyper-secretion of the hydrochloric acid, and rubus of the gastric mucosa.....and

**I BECOME MOST UNPLEASANT!!!!!!**

Copyright by John B. Reeves Corp., Daytona Beach, Fla.

# Safety Fights Corrosion with

**PROTECTOSEAL**

**APPROVED**

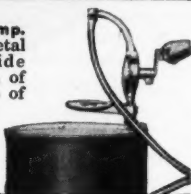
**FIRE PREVENTIVE EQUIPMENT**

**Space-saving Stainless Steel Shelf Can.** Oval shape permits maximum number of containers in minimum space; when grasped by handle is in correct position for pouring. Seam-welded construction; double-wall fire baffle in spout; self-closing cap with ball and socket seals liquid vapors and provides pressure relief. Also supplied in terne plate. 1-gallon capacity.



**Stainless Steel Wide-Mouth Disposal Can.** Large  $3\frac{3}{4}$ " opening may be locked in open position; seam-welded body with perforated metal fire baffle. Leak-proof spring-loaded cap prevents evaporation and provides pressure relief. Also available in terne plate. Sizes: 2-gals. and 5-gals.

**Safety Transfer Pump.** Three perforated metal fire baffles provide safety from bottom of suction tube to top of discharge nozzle. Static-proof hose. Steady even flow; fast shutoff.



**Safety Storage Cabinet** permits storage of 45-gallons of hazardous liquids in any department in approved fire preventive containers of not more than 5 gallons. Complies with specifications of NFPA.

Protectoseal designs and builds All Types of Approved Fire Preventive Equipment for the Storage, Transfer and Plant use of all Flammable Liquids.

Check coupon and attach to company letterhead.  
In Canada, Safety Supply Co., Canada

The Protectoseal Company  
1932 So. Western Avenue, Chicago 8, Illinois  
Send without obligation the descriptive literature checked.

☐ Laboratory Safety Equipment Catalog Sheet  
☐ Hazardous Liquid Equipment Chart and Price List of more than 30 Approved Fire Protective Devices

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 7583  
opposite last page

## SAFETY

### Senses malfunctions in rotating or reciprocating equipment . . .

holding coil prevents actuation from start-up vibration or normal transient shocks

Vibration monitor senses trouble in rotating and reciprocating machines by responding to slight increases in roughness or vibration and causing shutdown before further damage occurs. Sensitive to such malfunctions as bearing failures, bent shafts, unbalance, broken blades, units can be used on pumps, motors, compressors, blowers, or centrifuges. Unit may be used singly on small equipment, in pairs on driving or driven equipment, or in series or parallel combinations to monitor each bearing. Acceleration range is 0 to 2 gr to cover all types of rotating equipment at speeds to 18,000 rpm.

Monitor includes shock-free holding and reset mechanism for automatic or remote operation to prevent actuation from starting or from normal accidental transient shocks. Unit employs no vacuum tubes or electronic components, is maintenance-free. It is supplied in explosion-proof housing for class I, group D; class II, groups F & G locations, or gasketed for non-hazardous outdoor locations. Housing is of cast aluminum threaded for  $\frac{3}{4}$ " conduit. Terminals are provided for heater resistor to prevent condensation.

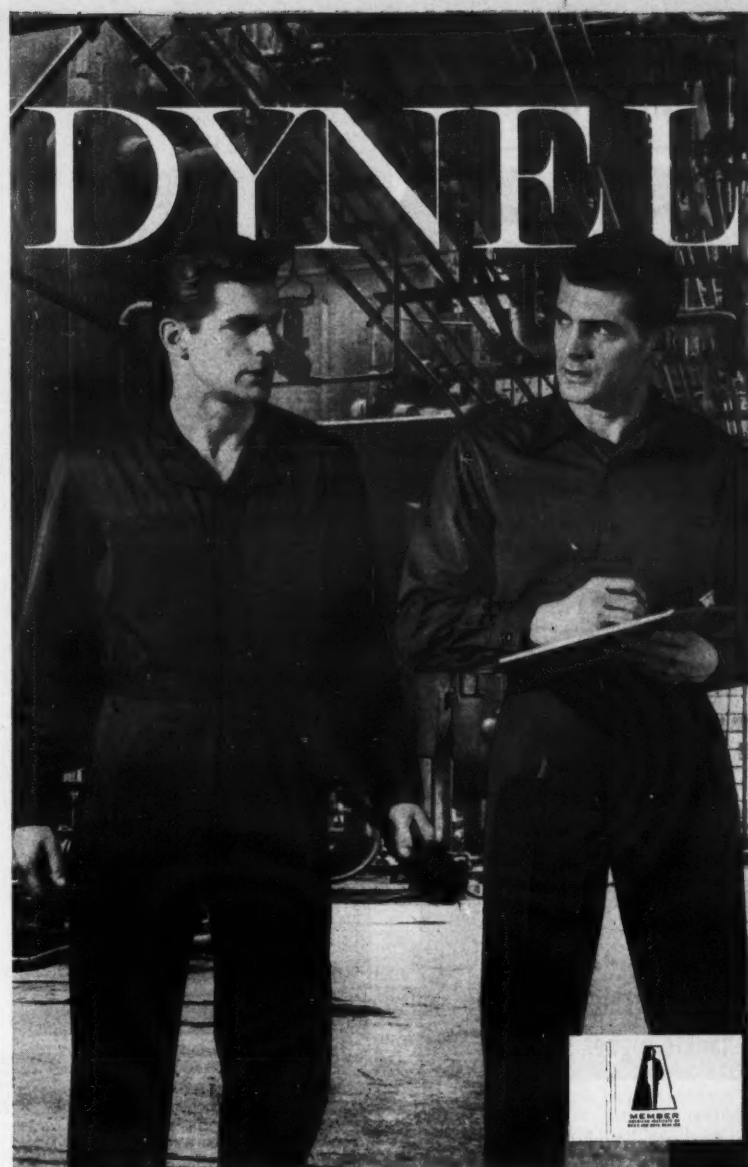
(Model 5 Vibraswitch is manufactured by The Beta Corporation, Dept. CP, Forest Avenue at Ridge Rd., Richmond 26, Va. . . or for more information check 7584 on form opp. last page.)



**Meter reader**

. . . for hazardous locations features heavy round glass window. Enclosure need not be opened to make readings. Safety housing has a threaded cover and  $\frac{3}{4}$ -inch hubs for rigid conduit, though other models are available for various types of conduit. Enclosure is explosion-proof, dust and rain tight.

(Pylet enclosure is a product of Pyle-National Co., Dept. CP, 1334 N. Kostner St., Chicago, Ill. . . or check 7585.)



## FOR MAXIMUM RESISTANCE to chemicals, wear and laundering IN WORK CLOTHES

Wide use proves that work clothing made of DYNEL often lasts four or five times longer than comparable garments made with traditional fibers. DYNEL is unaffected by most chemicals; can be washed, dry cleaned or decontaminated in acids without harm; will not support combustion; retains strength wet or dry. Write for list of manufacturers.

DYNEL • Union Carbide and Carbon Corporation 30 East 42nd Street, New York 17, N. Y.

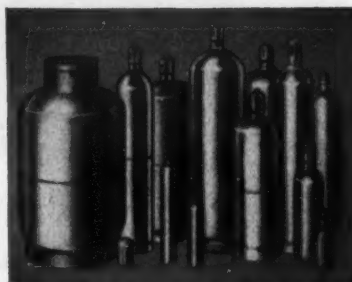
When inquiring check 7586 opposite last page





as light as  
a wisp

Lightweight Hackney cylinders  
save freight . . . help you  
tackle higher shipping costs



Hackney compressed gas cylinders are made in many sizes, for high-pressure or low-pressure shipment of all types of gases.

The low tare weight of Hackney compressed gas cylinders saves shipping dollars for you. Here's a practical, immediate answer to higher shipping costs resulting from increased freight rates.

Lightweight Hackney cylinders weigh less because they are made of selected high-quality steel that assures adequate strength without excess weight. In addition, the Hackney

process of cold drawing produces uniform side wall thicknesses that eliminate excess material.

Low tare weight is just one of the big reasons why Hackney seamless or two-piece cylinders are so often selected for the safe shipment of compressed gases. Rigid inspection, uniformity, durability, smooth surfaces and neat appearances are other good reasons. Write for specification sheets.

## Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 S. 66th St., Milwaukee 14, Wisconsin • District Offices  
52 Vanderbilt Ave., Rm. 2087, New York 17 • 235 Hanna Bldg., Cleveland 15,  
Ohio • 4247 North Ave., No. 14, Cincinnati 36, Ohio • 57 East Wentworth  
Court, Rm. 109, Minneapolis 19, Minn. • 936 W. Peachtree St., N.W., Rm. 126,  
Atlanta 9 • 203 S. LaSalle St., Rm. 796, Chicago 4 • 568 Roosevelt Bldg., Los  
Angeles 17 • Downingtown Iron Works, Inc., Division, 144 Wallace Ave., Down-  
ingtown, Pa.



CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check 7587 opposite last page

## packaging



ICC-approved drum liner enables Dearborn to . . .

## SHIP HYDROCHLORIC ACID IN ST

**Problem:** At the new Lake Zurich plant, Dearborn Chemical Co. processes and ships inhibited hydrochloric acid for boiler cleaning and conditioning. Material has previously been shipped in two types of conventional 13 gallon containers, both satisfactory but both having rather high tare weights. Heaviest of the previous containers has dead weight of 75 pounds, other unit weighs about 35 pounds. And life expectancy on one of the older units was found to be around

nine months . . . about six trips.

**Solution:** While still using old units to some extent, Dearborn has adopted a polyethylene container, first of its type to receive ICC approval for interstate shipment. Container consists of molded rigid poly drum, contained in steel overpack, similar to conventional steel shipping drums. Dead weight on new container is only 22 pounds . . . original cost of lined container is only about half that of the conventional units.



Containers for inhibited hydrochloric acid weigh and cost less than conventional containers. Blow-molded construction of unit enables it to withstand 20 ft drop test while full of water

## IN STEEL CONTAINERS

Available in all standard drum capacities (5, 15, 30, and 55-gallon), containers are of all molded construction . . . have no joints, welds, or seams.

**Results:** Although units have been in use for less than a year, no objections have been raised. Shipping rates have been reduced . . . units are shipped at standard drum rates. Reduced first costs and added durability of drums has enabled Dearborn to reduce deposits required of users.

(Polyethylene drums are products of Delaware Barrel and Drum Co., Dept. CP, Box 1648, Wilmington, Delaware. Check 7588 opp. last page.)



## Got a use for the WORLD'S TOUGHEST PACKAGING FILM?

New "Scotchpak" Brand Polyester Film is *heat sealable*! Seal is as tough as film itself! Perfect for difficult packaging jobs where inertness and protection to the shipping material under extreme temperatures are essential.

Resists most solvents and chemical attacks. Has high moisture inertness. Easily heat sealed (275 to 359 F. at 20-60 psi). High tensile strength.

"Scotchpak" Polyester Film is ideal for packaging the following varied substances: cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltic products, catsup and mustard, surgical dressings and many others. Also suited for container liners, insulation pillows . . .

Where can you use new "Scotchpak" Polyester Film?

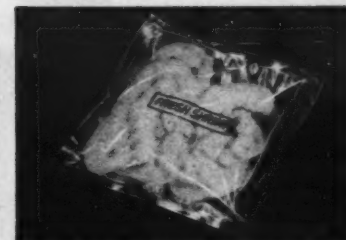
## "SCOTCHPAK" BRAND POLYESTER FILM HEAT-SEALABLE

Made in U.S.A. by Minnesota Mining and Mfg. Co., St. Paul 6, Minn.—also makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. Export Sales Office: 99 Park Avenue, New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

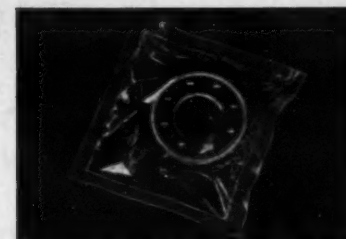
Look what you  
can do with it



**CHEMICALS** or acids of most any type are packaged easily, handled safely, shipped surely in heat sealable containers of new "Scotchpak" Polyester Film.



**FOOD** is packaged safely, temptingly in clear, transparent "Scotchpak" Polyester Film. Contents may be easily frozen . . . even boiled right in the package! Low gas penetration rate. Non-toxic.



**MACHINE PARTS** can be packaged dry or in oil or grease to eliminate corrosive action. Packages are transparent, easy to handle, easy to ship and store. Simplifies identification and issuing of individual parts and units.



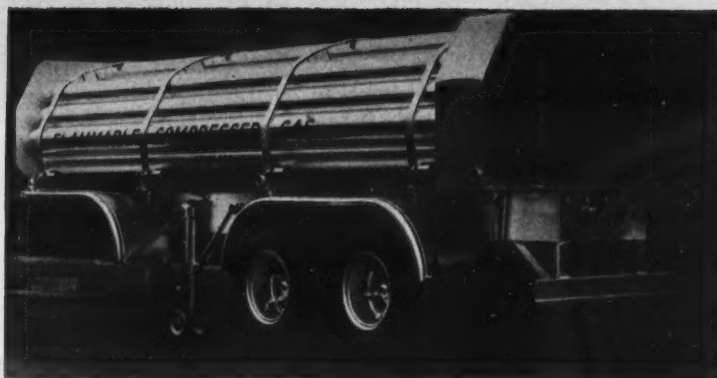
**FREE FOLDER** shows dozens of new ideas on how you can solve your most difficult packaging and shipping problems using new "Scotchpak" Polyester Film. Write on your Company letterhead to Film Products Group, 3M Co., St. Paul 6, Minn., Dept. 01-96.



When inquiring check 7589 opposite last page



# TAYLOR- WHARTON GAS TRANSPORTS



**provide compact, mobile, economical gas storage**

Today many users of bulk compressed gases are turning to Taylor-Wharton Gas Transports for substantial savings and greater flexibility of operations.

Low initial cost, economical gas storage and extreme mobility are some of the advantages which make this unit especially attractive as compared with permanent

bulk storage.

Numerous oil refining, petro-chemical, food and electronic companies have found that the use of transports is a practical answer to their needs for interplant haulage and standby equipment.

All transports consist of a group of 2400 p.s.i. seamless steel storage pressure

vessels (ICC3A2400) securely mounted to standard semi-trailer chassis. The tubes are valved and manifolded together to a single common outlet within a rear mounted weatherproof cabinet. Capacities range from 38,500 cu. ft. to 56,250 cu. ft. depending on type of gas and size of unit.



For further information, send for our brochure describing these units, mentioning type of gas and storage requirements.

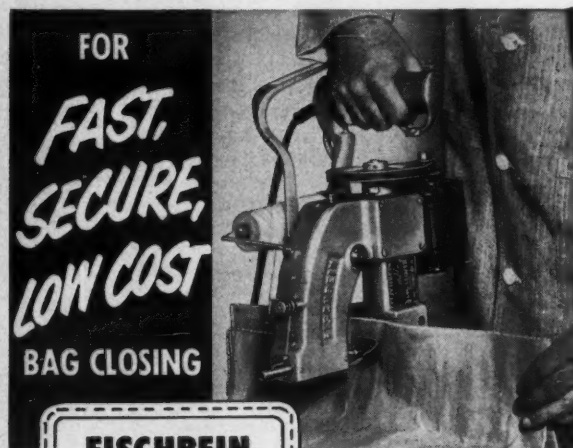
More than a century in Harrisburg.

DIVISION OF

**Taylor-Wharton Co.**

**Harsco Corporation Harrisburg 24, Pennsylvania**

When inquiring check 7595 opposite last page



**FOR  
FAST,  
SECURE,  
LOW COST  
BAG CLOSING**

**FISCHBEIN  
Portable  
BAG CLOSER**

- A truly portable bag closer . . . Weighs only 10½ pounds.
- Requires no installation . . . plug into any outlet.
- Handles textile and paper bags.
- Simple to operate and maintain.
- Lowest priced bag closer on the market.

FOR DETAILS,  
MAIL THIS COUPON NOW  
**DAVE FISCHBEIN CO.**  
Dept. 9B  
2720 30th Ave., So.  
Minneapolis 6, Minn.

Name.....

Firm Name.....

Address.....

City.....

State.....

When inquiring check 7596 opposite last page



**PUT YOUR PRODUCTS IN  
Clearsite PLASTIC JARS  
FOR ALL TO SEE—AND BUY**

Clearsite Plastic Jars help increase sales, reduce shipping costs, practically eliminates breakage loss. They're moisture-tight, dust free, chemically inert. Easy to print or label. Stock sizes up to sixteen ounces.

Clearsite cylindrical plastic containers are produced in a wide variety of shapes, sizes, colors and closures. Write for free sample and descriptive literature to Department G.

**CELLUPLASTIC CORPORATION**

Sales and Executive Offices Newark, New Jersey

When inquiring check 7597 opposite last page

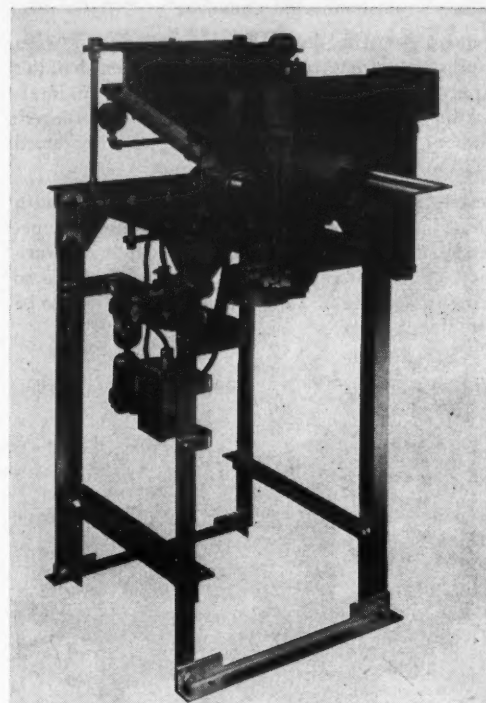
## PACKAGING

**Uses fluidizing principle  
for bag filling**

**Uses:** Packer fills valve bags to predetermined weights with accuracies to  $\pm$  two ounces.

**Features:** Fluidized handling minimizes product degradation.

**Description:** Unit, operated on 110v AC power supply, requires only 4 to 6 cubic feet per minute



Bag packer is adaptable to filling of pails or drums

of air at 60 to 80" psi. Operating without noise or vibration, unit is adaptable to filling of drums and pails. Packer handles bags weighing from 10 to 125-lb packed weight.

("Airflow" Bag Packer is product of Black Products Co., Dept. CP, 13513 Calumet Ave., Chicago 27, Ill. . . or for more information check 7598 on form opposite last page.)

- \* Why the "distinctive" size of **CHEMICAL PROCESSING**?
- \* Why its "different" editorial treatment?
- \* How do these help the reader?

See explanatory letter from the Editors on page 100.

**Describes line of wrapping and cartoning machines**

Printed in two colors, 40-page catalog describes complete line of wrapping and packaging equipment. Explaining applications and operation on each specific piece of equipment, catalog shows samples of products that machines are packaging.

Revised Packaging Equipment Catalog is issued by F. B. Redington Co., Dept. CP, 3000 St. Charles Road, Bellwood, Ill. When inquiring specify 7599 on form opposite last page.

**Suggests boxcar loading method**

Twelve-page booklet describes "Prone Method of Loading", using axial strength (end to end) of cans or glass containers in fiber board boxes. Placing of containers on sides with ends toward end walls of the car uses the strength in relation to forces of transportation.

"Prone Method of Loading" is issued by the Association of American Railroads, Dept. CP, 59 E. Van Buren St., Chicago 5, Ill. When inquiring specify 7600 opposite last page.

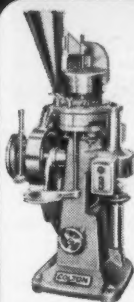


**Of particular interest to cosmetic packagers**

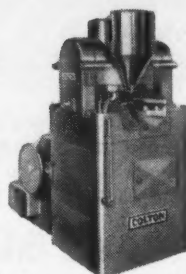
... six-ounce (202 x 314) dome top aerosol cans (left) have painted side seams which match background color on can's body. Available soon on several other can sizes, design offers wider possibilities for placement for trademark, directions, or other information.

(All-around colored aerosol container is product of Continental Can Co., Dept. CP, Continental Can Building, 100 E. 42nd St., New York 17, N. Y. . . . or check 7601).

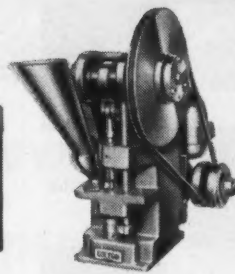
# COLTON- FIRST NAME IN HIGH-PRODUCTION EQUIPMENT FOR 70 YEARS



**TABLET PRESSES.**  
Single Rotary—Nos. 216; 240; 250; 270. Up to 1150 tablets per min. Up to 2" tablet dia.



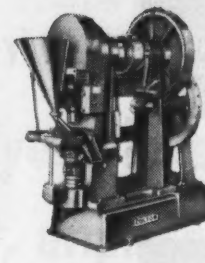
**TABLET PRESSES.**  
Double Rotary—Nos. 233; 241; 260. Up to 2900 tablets per min. Up to 1 3/4" tablet dia.



**TABLET PRESS.** Single Punch, Bench Type—No. 301. Up to 65 tablets per min. Up to 1/2" tablet dia.



**TABLET PRESSES.** Single Punch—Nos. 321; 331; 341. Up to 125 tablets per min. Up to 1 1/2" tablet dia.

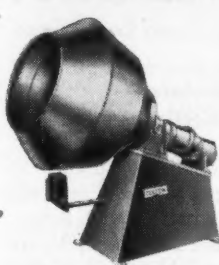


**TABLET PRESSES.** Single Punch, Heavy Duty—Nos. 345; 350; 360. Up to 85 tablets per min. Up to 3" tablet dia.

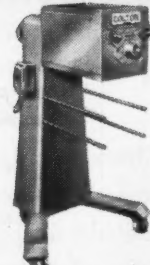


**TABLET and CAPSULE COUNTERS**—No. 715 Single; No. 705, 5-Bottle; No. 710, 10-Bottle.

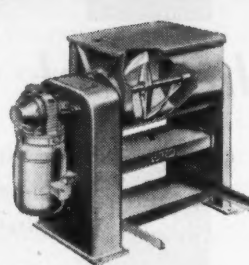
## THE ONLY COMPLETE SERVICE TO THE CHEMICAL, DRUG AND COSMETIC INDUSTRIES



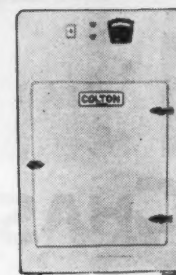
**COATERS: POLISHERS: BLENDERS**—No. 36. Laboratory Size; No. 26. Bench Size; No. 16. Standard Size; No. 17. Fluid Drive; No. 56. Tilting Type; No. 46. Large Blender.



**GRANULATORS.** Dry No. 540 Single; No. 542 Rotary or Oscillating; No. 544 Twin. Also, Wet Granulators No. 561, 6-Blade.



**MIXERS.** Dry—No. 617, 17 Gal.; No. 636, 36 Gal.; No. 685, 85 Gal.; No. 695, 175 Gal. Also, Paste Mixers.

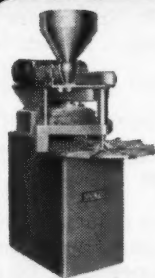


**DRYING OVENS**—No. 1018, 10-Tray Lab.; No. 2433, 24-Tray Cabinet; No. 4833, 48-Tray Truck.

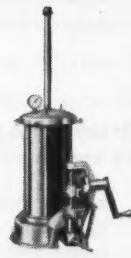


**STAINLESS STEEL STOCK POTS & TANKS**—All types, open and closed. All sizes up to 5,000 Gal.

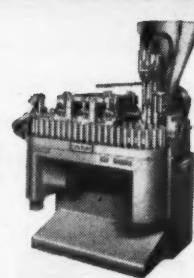
## STANDARD MACHINES • SPECIAL MACHINES • ENGINEERING CONSULTATION • SERVICE



**MULTIPLE SPOUT LIQUID FILLERS**—No. 130. Hand Operated. Up to 30 tubes or jars per min. Up to 1" x 5 1/2" tube size, with single stroke.



**CREAM AND PASTE FILLER**—No. 130. Hand Operated. Up to 30 tubes or jars per min. Up to 1" x 5 1/2" tube size, with single stroke.



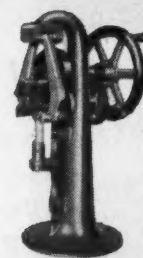
**TUBE FILLERS AND CLOSERS, AUTOMATIC**—Nos. 175; 180; 185. Up to 300 tubes per min., liquid to heavy paste.



**TUBE AND JAR FILLERS, GEAR OR WORM, POWER DRIVEN**—Nos. 110; 140; 150. Up to 50 fills per min. Up to 2" x 11" tube size.



**TUBE FILLER, CLOSER, & CRIMPER, LIQUID**—No. 103. Up to 40—6-Fl. Oz. fills per min.



**TUBE CLOSER, HAND OPERATED**—Nos. 440; 450. Up to 20 tubes per min., 2 1/2" x 10" max. size.

## ARTHUR COLTON COMPANY

DIVISION SNYDER TOOL & ENGINEERING COMPANY  
3568 E. LAFAYETTE • DETROIT 7, MICHIGAN

PLANT No. 2—1030 McDougall, Detroit • PLANT No. 3—Mancelona, Michigan

Export Office—13 E. 40th St., New York City

SPECIALISTS IN PHARMACEUTICAL AND FILLING MACHINERY FOR 70 YEARS

Send for catalog of  
Pharmaceutical Equipment

Send for catalog of  
Filling Equipment

When inquiring check 7602 opposite last page



*you can*

Soda Ash	ACETAMIDE	Phenol	Alum
CALCIUM CARBONATE	ABIETIC ACID	Gallic Acid	METHYL CELLULOSE
PEARL MOSS (IRISH MOSS)	DIMETHYLUREA	INHIBITORS	IRON OXIDE
Adipic Acid	Talc	Waxes	Vanillin
RESINS	Calcium Chloride	SALICYLIC ACID	
GUM ARABIC	Umbers		
Citric Acid	BLACK LEAD (GRAPHITE)	Nichel Nitrate	
Benzoic Acid	AMMONIUM CHLORIDE	INSECTICIDES	Xanthane
Yeast	Barium Chloride	FULLERS EARTH	Borax

*pack ship store almost any dry chemical in CHASE bags*

*and save money doing it!*

Chase Multiwall bags give your dry chemicals (effluorescent, deliquescent or anhydrous) *complete* protection—yet, they cost far less than fiber drums, metal containers, or barrels...and they save up to 75% in storage space, too. Available in any combination of plies, with or without liners, tailored to YOUR exact requirements.

CHECK WITH CHASE—WHATEVER YOUR PACKAGING NEEDS

**CHASE BAG COMPANY**

General Offices: 309 W. Jackson Blvd., Chicago 6, Ill.

Prompt shipments and personal service from 32 nationwide branch plants and sales offices.

When inquiring check 7603 opposite last page

## PACKAGING

### Safety crimper prevents faulty seals

**Uses:** Device designed for crimping seals on steel strapping for cartons, drums or pallets.

**Features:** Single-crimp safety sealer has locking device which forces operator to complete sealing stroke before tool can be removed.

**Description:** Double-crimp for heavy-duty operations is also available.

(Safety strapping tools are available from Brainard Steel Division, Sharon Steel Corporation, Dept. CP, Griswold St., Warren, Ohio . . . or for more information check 7604 on form opposite last page.)

### Gives particulars — aluminum bottles

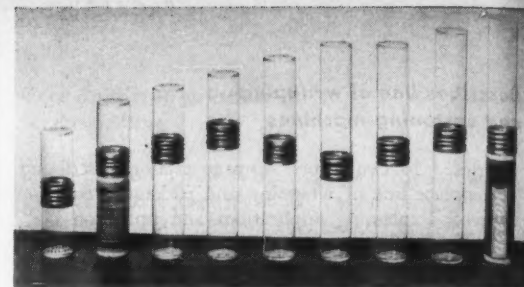
Eight-page booklet, printed in three colors, explains uses and advantages of aluminum bottles. Giving data and description of various available types, booklet explains how aluminum can solve specific packaging problems.

"Let's Take the Wraps Off Aluminum Bottles" is issued by Basic Material Supply Co., Inc., Dept. CP, 27 William St., New York 5, N. Y. Specify 7605 opposite last page.

### Details case histories on carton usage

Six case-history applications of heavy-duty corrugated container are illustrated in four-page brochure, printed in two colors. Description of various usages for such things as bulk chemicals, and textile yarns are described.

"Case Histories" is issued by Gaylord Container Corporation, Div. of Crown Zellerbach Corporation, Dept. CP, 111 N. Fourth St., St. Louis 2, Mo. When inquiring specify 7606 opposite last page.



### NEW LERMER PLASTIC COUPL-VIALS COMBINE SIZE FLEXIBILITY WITH PACKAGING BEAUTY AND UTILITY In Color Combinations

. . . can be used to package one or two different or related products in one long container!

LERMER'S new PLASTIC COUPL-VIALS are supplied in threaded cap and body sections joined by an aluminum coupling. Difficult-to-package products are packaged with ease, with beauty and utility. Sizes can be varied to your needs . . . 1" x 4" to 1" x 8" vials are available from stock . . . plus many more sizes on special order. By inserting a separator in the aluminum coupling, one or two different or related products can be packaged in the same vial. Write for complete details.

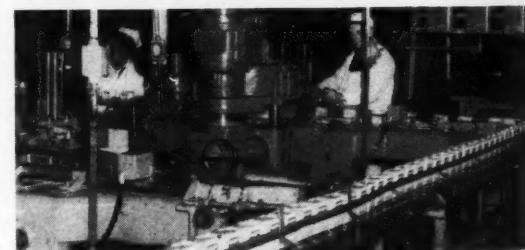


**LERMER PLASTICS, INC.** 53C South Ave. Garwood, N. J.  
REPRESENTATIVES IN THESE CITIES: Rochester, Memphis, Miami, Cincinnati, Columbus, Cleveland, Chicago, Detroit, Minneapolis, San Francisco, Los Angeles, Toronto.

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINERS

When inquiring check 7607 opposite last page

### If you Need Vacuum For Packaging

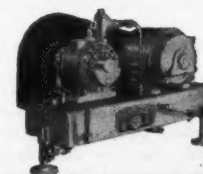


### You Can Get It For Less With a LAMMERT PUMP

Capacities from 4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).



Write for catalog giving specifications of Lammert Vacuum pumps and compressors.



**LAMMERT & MANN CO., INC.**

1753 Walnut Street, Chicago 12, Illinois, SEeey 3-0383

When inquiring check 7608 opposite last page

CHEMICAL PROCESSING

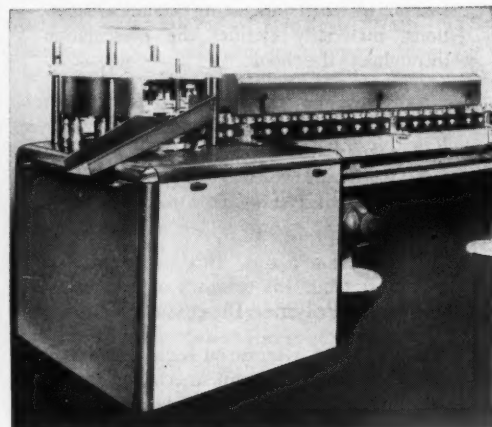
### Fills poly bottles up — upside down . . .

shoe polish, solutions, creams filled at rate of 180 squeeze bottles a minute

**Uses:** Fills plastic squeeze bottles with materials like shoe polish, liquid saccharin, lotions, cosmetic creams, similar products. Unit also seals and ejects finished bottles.

**Features:** Single unit fills, seals, and deposits squeeze bottles on conveyor line at a rate of 180 containers per minute.

**Description:** In operation, plastic bottles are held in aluminum cylinders for filling. Bottles are filled in an inverted position. Operator drops bottom disc into position, and holder and cover container are carried through heater with a spinning motion for even fusion. Rotary pressure unit is then pushed down on heated edge to complete seal. Filled, sealed bottle is then automatically ejected from holder onto conveying line for packing. Holder itself returns on a conveyor to reloading station.



Plastic bottles are handled in aluminum containers in this filler

Use of aluminum holder to support inverted plastic bottles makes handling of these comparable to handling conventional containers. Holders incorporate an adjustment feature (an insert) permitting use of one holder for several sizes of bottle. Entire sealing unit consists of straight electric heating element discharging to a rotary patten and ejection unit. Length of heating element is dependent on size of container and operating speed. (Average length of heating element is about six feet.)

(Combined sealer and filler for squeeze bottles is a development of Horix Mfg. Co., Dept. CP, Corliss Station, Pittsburgh 4, Pa. . . or for more information reader may simply check 7609 on form which is located opposite last page.)



*Periodic progress reports  
of interest and value to  
the chemical field*

## New fluid flow cans with polyethylene nozzle assure even pouring and exact, dripless cut-off

Tailor-made for liquid detergents and other corrosive products, Continental's recently-announced fluid flow cans incorporate a threaded, dripless polyethylene nozzle which is an innovation in the general line packaging field. Attached by a special Continental-engineered method, the tall nozzle permits an even pouring flow and provides an abrupt, exacting cut-off when pour is completed.

New enamel linings perfected by Continental's Research and Development department make these cans ideal for many products which could not be previously packaged in metal. In addition, a resistant varnish is available to prevent any marring of the lithographed surface through spillage in filling or use.

No solder is used anywhere in the construction. The side seam is cemented with thermo-plastic cement which permits complete wrap-around lithography. Can domes or tops can be supplied plain, coated, or lithographed in colors. Nozzles come in colors to closely match decorative designs. Manufactured in 12-, 16-, 22-, 32-oz. and half-gallon sizes.



Threaded polyethylene nozzle is dripless. Attached by solderless method — no solder margin to steal from lithographed area.



#### BACK VIEW

Side seam is securely cemented, permitting complete wrap-around decoration. No wide soldered seam to interrupt your selling message.

**CONTINENTAL  
CAN COMPANY**

EASTERN DIVISION: 100 E. 42nd St., New York 17  
CENTRAL DIVISION: 135 So. La Salle St., Chicago 3  
PACIFIC DIVISION: Russ Building, San Francisco 4

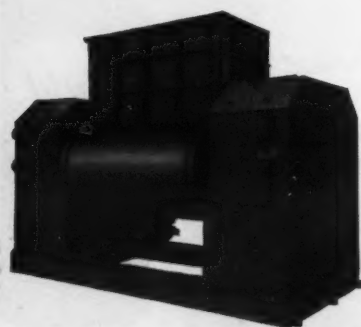


When inquiring check 7610 opposite last page





**READCO'S IMPROVED MIXER DESIGN  
PROVIDES COMPLETE DISPERSION  
IN LESS TIME...FOR LESS COST**



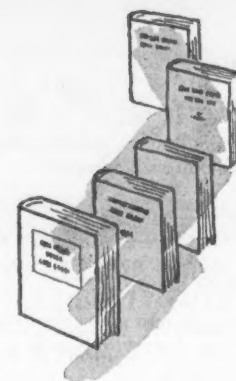
**Bakery-Chemical Division  
YORK, PENNSYLVANIA**

It's Readco's unique split-level dispersion bowl that makes the difference. It provides a greater ratio of surface to the volume of mix. Overlapping sigma arm mixing action exposes new surfaces and breaks down the entire mass with each rotation, producing a homogenous mix in a short mixing cycle, eliminating peak loads. Closer clearances between mixer arms and shell prevent build-up of materials.

Readco Paper Coating Mixers can be supplied for manual or hydraulic discharge in 150, 350 and 750 gallon working capacities. Write for complete information.

When inquiring check 7611 opposite last page

# Recent Books



## Fundamentals of Qualitative Chemical Analysis

*Reviewed by* JOHN A. DEAN  
*Associate Professor of Chemistry*  
*University of Tennessee*

In the 4th edition of McAlpine and Soule's well-known 340-page book there has been no change in the authors' point of view that the main purposes of a course in qualitative analysis are to give the reader direct contact with the chemical behavior of a number of common metals and acid radicals and to emphasize the necessity of working under controlled conditions. All the procedures have been rewritten to the semi-micro scale. The cations are still divided into the six classical groups, with hydrochloric acid, hydrogen sulfide in acid solution, ammonium hydroxide plus hydrogen sulfide, and ammonium carbonate as the group precipitants.

Individual chapters devoted to each group of metals or acid radicals are conveniently broken down into sections entitled: Common compounds and reactions of ions of the group; Preparing an original solution for precipitation of the group; Reactions of group constituents in the systematic precipitation of preceding groups; Precipitation and analysis of the ions in the group; Reporting the group ions in an unknown solution; The group in relation to other groups; Reactions of the group metals in the systematic analysis of a solution; Summary and review; Laboratory exercises; and Equilibrium problems pertaining to the group.

Included also are concisely written introductory chapters dealing with formulas, equations and chemical arithmetic, and two concluding chapters discussing the examination of dry unknowns.

Particularly valuable are the numerous explanatory notes following each procedural

step in the analysis scheme. Practicing analytical chemists will find much useful information compiled under the individual sections treating the reactions of each ionic specie. In general, the explanations and sample problems are so clearly set forth that the reviewer feels a reader should be able to master the material with only a minimum of additional instructional aid. Profuse use of actual ionic or molecular formulas, when discussing chemical reactions, materially clarifies the presentation throughout the book.

To obtain "Fundamentals of Qualitative Chemical Analysis" remit \$5 direct to D. Van Nostrand Co., Inc., Dept. CP, 250 Fourth Ave., New York 10, N. Y. Specify 7612 opposite last page.

## Polymer Processes

Volume 10 of a series on high polymers is edited by Calvin E. Schildknecht, of Stevens Institute of Technology, Hoboken, N. J., and embodies the work of twenty authors representing thirteen companies or universities.

Book has 914 pages and is divided into eighteen sections: Introduction to free radical polymerization; polymerization in bulk, suspension, emulsion, and solution; ionic polymerization; polyamides and polyesters; condensation with formaldehyde; cellulose and derivatives; epoxy resins; polysulfide polymers; adhesives; stabilization of polymers; paste and latex techniques; compounding and processing rubbers and resins; polymer reinforcement; and spinning and drawing fibers.

To obtain "Polymer Processes" remit \$19.50 direct to Interscience Publishers, Inc., Dept. CP, 250 Fifth Ave., New York 1, N.Y. When inquiring specify 7613 on form opposite last page.

reviews of current technical and reference work  
... summarized for you by authorities  
in the field working with the CP staff

### Temperature: Its Measurement and Control in Science and Industry

Reviewed by JACOB F. RYMAN  
Associate Professor of Physics  
Virginia Polytechnic Institute

This is a 467-page volume published by the American Institute of Physics and edited by Hugh C. Wolfe. It contains the papers presented at the Third Symposium on Temperature at the Bureau of Standards, Washington, D. C. Each article represents the latest work of an expert in his field. Latest developments in both the high and low temperature fields are presented. Book is well-arranged, with good illustrations and an excellent index. List of references at the end of each chapter is complete and up-to-date.

This volume, together with Volume I is a valuable reference source for the physicist, the chemist, and the engineer interested in the precise measurement and control of temperature, and may be used as a supplementary text in courses in pyrometry and thermodynamics.

To obtain "Temperature: Its Measurement and Control in Science and Industry, Vol. II" remit \$12 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

### High Vacuum Technique

This third edition of J. Yarwood's "High Vacuum Technique" contains chapters devoted to the production and measurement of high vacua, measurement of pumping speed, degassing and "gettering" industrial applications of high vacua, and the properties of materials important in high vacuum technique. Among the new features are: an analysis of British and American pumps, gas ballast pump, theory of the diffusion pump,

modern valves, and methods of hunting for leaks.

The 110 figures are well-drawn, and tabular material appears to be adequate. Bold-face headings, generous margins, and a good index make this 208-page book easy to use. The style is not too British for American readers.

To obtain "High Vacuum Technique" remit \$5.50 direct to John Wiley & Sons, Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify 7614 on form opposite last page.

### Introduction to the Study of Chemical Reactions in Flow Systems

Reviewed by STUART R. BRINKLEY, JR.  
Combustion and Explosives Research, Inc.

This 94-page work constitutes a brief summary of the principles of classical chemical kinetics and discusses application of these principles to flow problems involving reacting fluids.

In the first chapter, principles of classical chemical kinetics are reviewed with particular emphasis on limitations of steady state approximation for chain reactions. The hydrodynamic conservation equations expressing transport of mass, momentum, and energy are formulated for reacting continua in the following chapter. Third chapter is devoted to the discussion of an example—adiabatic flow of a reacting fluid through a nozzle, solutions being presented for near-equilibrium and near-frozen conditions. Final chapter is devoted to several topics concerning heterogeneous chemical reactions, including diffusion flames.

Aim of author (S. S. Penner, Butterworth Scientific Publications, London) was to present an adequate summary of this important

(Please turn to next page)



Countless successful applications of C-V Rings under the most severe service conditions have made this the closest approach to a universal packing. It will effectively handle all industrial acids, alkalis, solvents, organic and hydraulic fluids... temperatures from  $-120^{\circ}\text{F.}$  to  $+500^{\circ}\text{F.}$  ...is equally suited to valves, pumps, mixers, hydraulic cylinders and like equipment.

"John Crane" C-V Rings have extremely low coefficient of friction. "Break-out" friction is only slightly higher than running friction.

#### TWO STYLES ARE AVAILABLE:

**C-VU RINGS for low pressure service**—such as control and regulator valves handling gases and fluids, where it is necessary to have a very sensitive and resilient type packing.

**C-VH RINGS for high pressure service**—for use in pumps, hydraulic cylinders and like services at pressures ranging to 500 psi. and over. These rings are constructed with a heavy wall heel to withstand pressure requirements. They are designed to provide voids between rings, so that as the Teflon expands due to heat,

this take-up room minimizes any excess friction in the stuffing box. "John Crane" C-V Rings are available in full line of standard sizes and male and female adaptors. Sizes can be molded to stuffing box specifications.

Request Bulletin T-110.

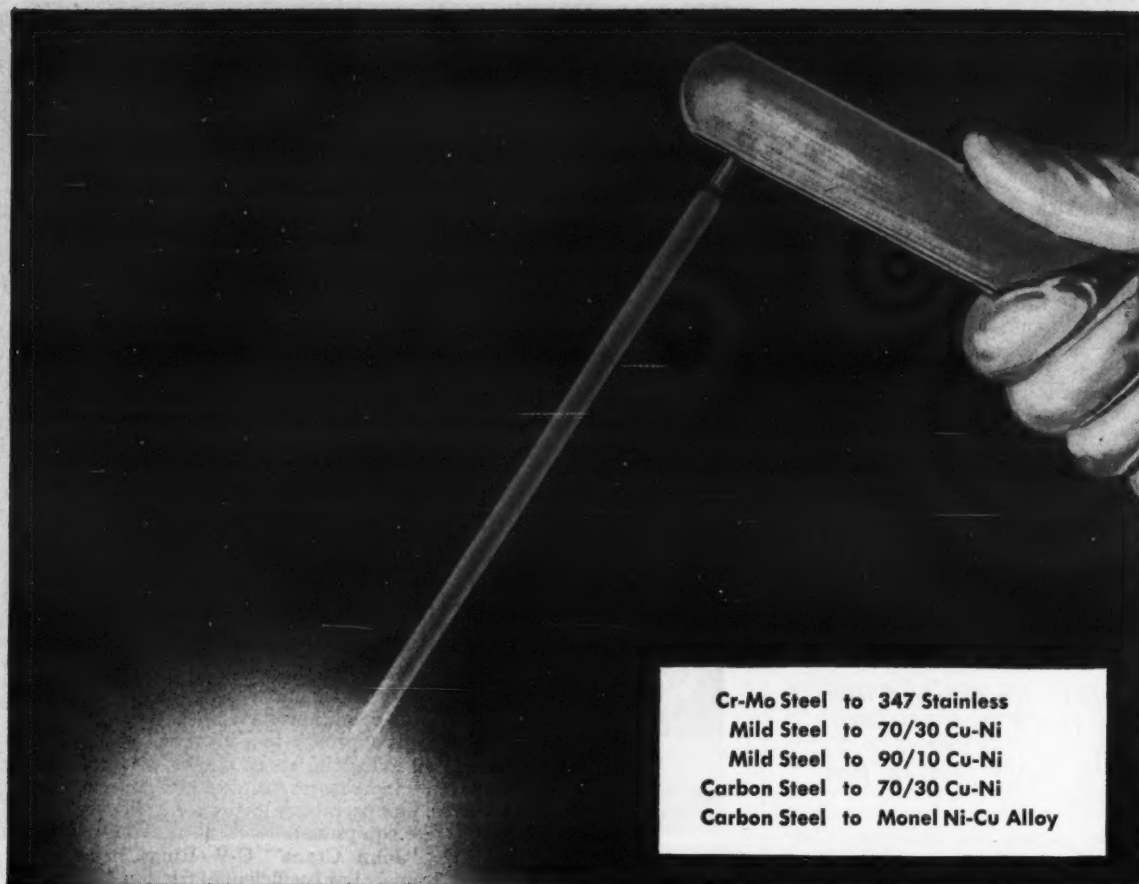
\*"John Crane" C-V Rings are made from Chemlon—the best in DuPont Teflon.

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ont.



When inquiring check 7615 opposite last page





Cr-Mo Steel to 347 Stainless  
Mild Steel to 70/30 Cu-Ni  
Mild Steel to 90/10 Cu-Ni  
Carbon Steel to 70/30 Cu-Ni  
Carbon Steel to Monel Ni-Cu Alloy

## Fabricator welds 5 dissimilar alloy combinations with Inco-Rod "A"

### Proves electrode's versatility

Time after time, Inco-Rod "A" proves successful in welding dissimilar alloy combinations.

Think of the *variety* it welds for just one fabricator.

In producing evaporators, this company joins 2 1/4% Chromium-1% Molybdenum Steel to 347 Stainless. Inco's Technical Service representative reports: 'good fusion and sound welds are obtained. Operator likes the way Inco-Rod "A" handles.'

In distilling equipment, they weld 1020 Carbon Steel to 70/30 and 90/10 Copper-Nickel Alloy. The report: 'Inco-Rod "A" gives excellent results . . . good bead appearance and fusion . . . no porosity or cracking.'

Results are similar in welding SA-266 carbon steel to 70/30 Copper-Nickel and Monel® nickel-copper alloy for a heat exchanger. 'Better arc control than with pre-

vious electrode . . . pin holes are reduced about 80%.'

But successful welds are not surprising with Inco-Rod "A" . . . the new electrode with the distinctive *green* flux coating. It welds *most* dissimilar alloy combinations . . . both between and among ferritic and austenitic stainless steels, low alloy steels, mild steels, high nickel alloys, and other alloys.

Welds are strong and ductile . . . of X-ray quality. Corrosion resistance usually equals or exceeds that of the base metal. And operability is excellent in any position . . . spray type arc . . . easy slag removal.

Are you having trouble welding dissimilar alloys? Chances are good that Inco's Technical Service can help you. Write us giving details.

\*Registered Trademark

**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street New York 5, N. Y.

INCO-ROD "A" electrode is supplied in 14-inch lengths in four diameters, 3/32-, 1/8-, 5/32- and 3/16-inch (the 3/32-inch is center grip) packed in 5-lb. containers (NEMA color coded).



**Welding Products** • electrodes, wires, fluxes



When inquiring check 7616 opposite last page

## Recent Books

(Continued from preceding page)

field, intelligible to investigators without previous training, and to provide the necessary basic material for intelligent formulation of flow problems involving reacting fluids. This could hardly have been achieved in a volume of this length.

Volume effectively emphasizes necessity for combining results of the study of chemical kinetics with principles of hydrodynamics in order to attain the framework within which important problems such as combustion can be effectively studied. It will be of primary interest to investigators with some experience in these fields and to this audience it is heartily recommended.

To obtain "Introduction to the Study of Chemical Reactions in Flow Systems," remit \$3.00 direct to Interscience Publishers, Dept. CP, 250 Fifth Avenue, New York 1, N.Y. Specify 7617 opposite last page.

### Combustion Researches and Reviews, 1955

Reviewed by DR. BERNARD LEWIS  
*Combustion and Explosives Research, Inc.*

This volume of 187 pages is one of the AGARDograph monographs issued by the Advisory Group for Aeronautical Research and Development of NATO. It contains fourteen invited papers in the field of combustion which were presented at the AGARD Combustion Panel Meetings held at Scheveningen, Netherlands, in May 1954 and in Paris, France, in November 1954.

The scope of this book can best be appreciated by listing the titles of the papers.

1. Diffusion Flames in the Laboratory, by J. Barr.
2. Some Problems Pertinent to the Combustion of Sprays, by M. Gerstein.
3. Some Aspects of Combustion of Liquid Fuel, by C. C. Graves and M. Gerstein.
4. La Formation et l'Evolution des Brouillards Combustibles, by R. Kling.
5. Some Notes on Spray Combustion, by J. R. Joyce.
6. The Correlation of Combustion Efficiency and Injector Characteristics under Simulated Altitude Conditions, by Staff of National Gas Turbine Establishment, British Ministry of Supply.
7. Flame Stabilization and Flame Propagation in Ramjet Combustors, by J. P. Longwell.
8. Etude des Limites de Stabilité en Relation avec la Résistance des Obstacles à

## Recent Books

- l'Ecoulement*, by A. Mestre.
9. A Spontaneous Ignition Theory of Combustion Intensity and Combustion Stability Behind a Baffle, by B. P. Mullins.
  10. The Mechanism of Carbon Formation, by G. Porter.
  11. Formation et Dépot de Carbone dans les Foyers de Turbo-Machines d'Aviations, by C. Fouré.
  12. Similarity Analysis for Chemical Reactors and the Scaling of Liquid Fuel Rocket Engines, by S. S. Penner.
  13. Rayonnement des Flammes et Similitude, by C. Codegone.
  14. The Role of Wake Transition in the Process of Flame Stabilization on Bluff Bodies, by E. E. Zukoski and F. E. Marble.

French titles are given of those papers written in that language.

A bilingual list of technical and scientific combustion terms is included. A preface is written by B. P. Mullins, Chairman of the AGARD Combustion Panel.

All the subjects are of considerable interest in technical combustion problems. The experts selected to cover them have made an important contribution.

To obtain "Combustion Researches and Reviews, 1955" remit \$5 direct to Interscience Publishers, Dept. CP, 250 Fifth Ave., New York 1, N. Y. Specify 7617A opp. last page.

### Polyesters and Their Applications

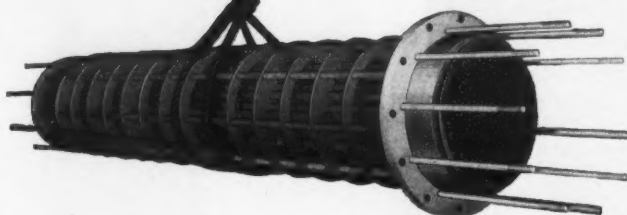
Described as the "first comprehensive survey of the entire polyester field from raw materials to finished product," this 618-page book covers the field as of early this year. As the field is in an "endless process of improvement," the authors — Johan Bjorksten, Henry Tovey, Betty Harker, and James Henning of Bjorksten Research Laboratories, Inc., of Madison, Wisconsin — plan to publish periodic supplements to the book.

Sections of this book are Theoretical Considerations, Unsaturated Polyesters, Saturated Polyesters, Testing, Health Hazards, Bibliography, and Author and Subject Indexes.

Over 3300 references covering most phases of production and use of polyesters are cited. The two bibliographies alone cover 314 pages, over half the book.

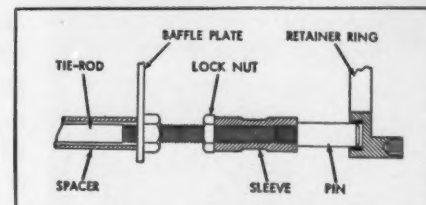
To obtain "Polyesters and Their Applications" remit \$10.00 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

...and  
thereby  
hangs  
a  
tale



In recent years, Alberger has developed a simple, compact and rugged frame for "Karbate" Impervious Graphite tube bundles. "Karbate" Impervious Graphite is the material which has been so extraordinarily successful in handling concentrated acids and alkalis, salt solutions, halogens, and organic solvents. The patented Alberger frame completely protects the "Karbate" tubes during shipment, installation, maintenance, interchanging and replacement. You can even sling a rope around the middle, as shown in the illustration.

Alberger "Karbate" Heat Exchangers, cost slightly more than other "Karbate" exchangers, but they insure against breakage of the very expensive tube bundles. Thus, in the long run, Alberger "Karbate" Heat Exchangers are far less expensive, and they greatly reduce the labor costs involved in maintenance because they are so much easier to handle...Write for Bulletin K-212.



Stainless steel pins at end of tie rods slide in bushed clearance holes of floating tube sheet retainer ring.

**ALBERGER HEATER DIVISION**  
**ADSCO INDUSTRIES, INC.**  
20 MILBURN ST. BUFFALO 12, N. Y.

When inquiring check 7618 opposite last page

## NORTHERN NITRALLOY PUMPS



Northern Nitralloy Steel Block Pumps are used in industries ranging from chemical laboratories to sandpaper manufacturing; and from oil refineries to corn syrup and candy industries. They are used to pump propane, ink, asphalt, peanut butter, molten lead, shellac and countless other products. Whatever your requirements, Northern Pump Company has the correct pump for any service.



There is a Northern Nitralloy Steel Block Rotary Pump made for every rotary pump requirement. Write today for detailed information including engineering data and description of complete Northern Pump line.

**NORTHERN ORDNANCE INC.**  
Subsidiary  
**NORTHERN PUMP CO.**  
Minneapolis, Minnesota

When inquiring check 7619 opposite last page



# PARTICLE SIZE REDUCTION BY IMPACT!



Illustrated below is the  
**CONTINUOUS RECORD SCRAP  
GRINDING SYSTEM...**  
engineered by the  
**ENTOLETER DIVISION**  
in conjunction with the  
engineering department of  
**CAPITOL RECORDS, Inc.**  
for Capitol's Scranton plant.

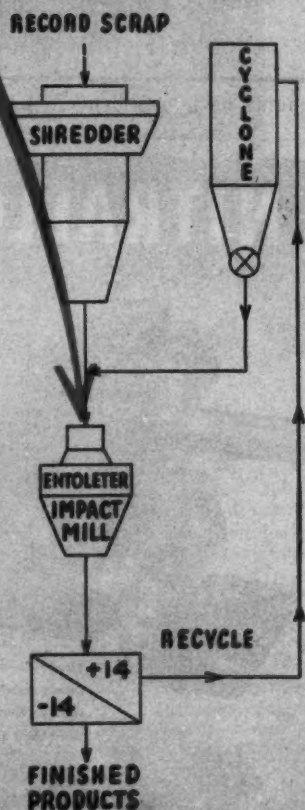
*This efficient installation  
combines...*

- PNEUMATIC CONVEYING  
EQUIPMENT
- SEPARATING EQUIPMENT
- AN "ENTOLETER"  
IMPACT MILL

*assuring high production  
with these advantages...*

- 2500 pounds of desired product  
per hour
- a total requirement of less than  
50 H.P. for the entire system
- the grinding operation produces  
less than 12° F. product temper-  
ature increase

New "Entoleter" Impact Mill applications are  
being developed continually in our laboratory  
in New Haven. Contact us today about your  
grinding system problem!



**ENTOLETER DIVISION  
SAFETY INDUSTRIES, INC.**  
Formerly The Safety Co. Heating and Lighting Co., Inc.  
P.O. Box 904 New Haven 4, Conn.

When inquiring check 7620 opposite last page

## processing equipment

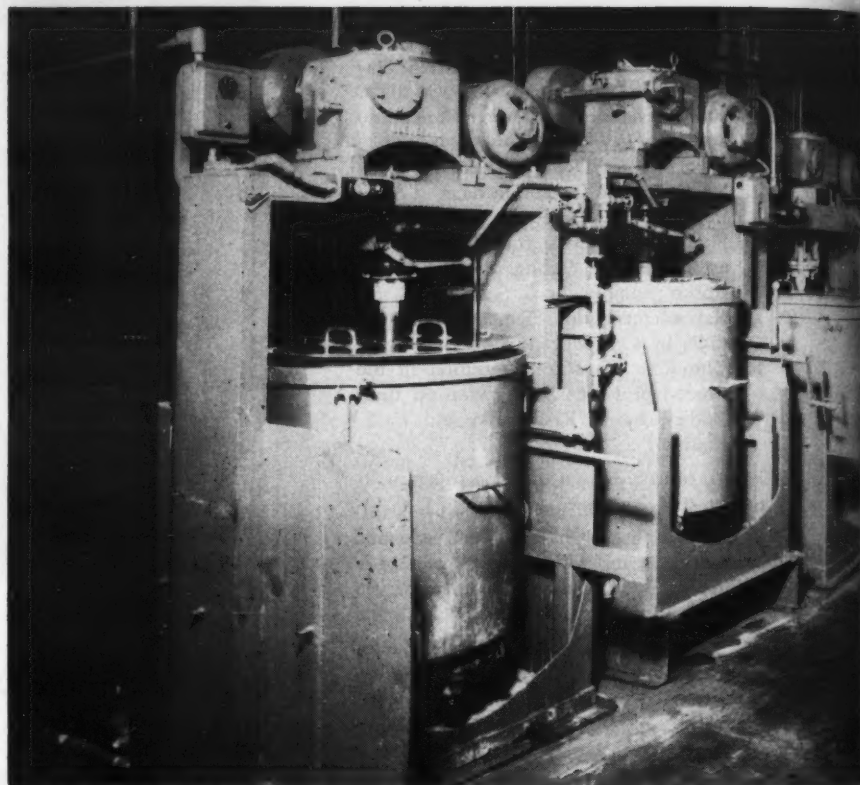


Fig 1—Operator checks some of B.F. Goodrich's grinding units

*Increased efficiency, reduced power and labor costs  
in fine grinding give B.F. Goodrich...*

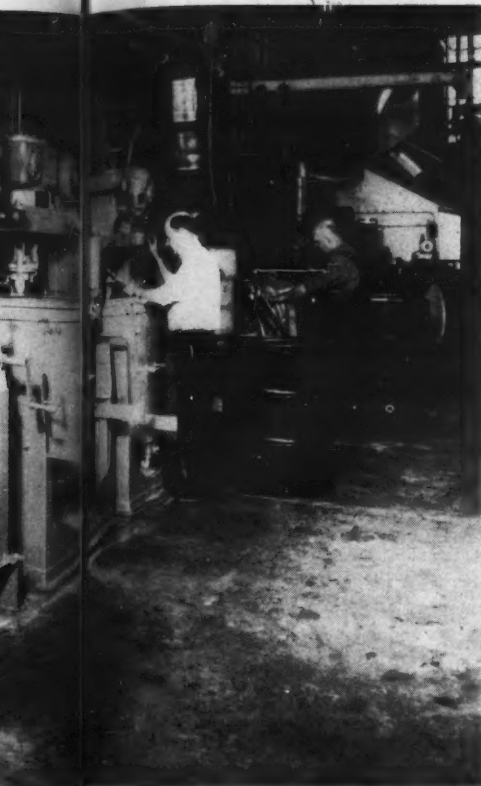
## more efficient and economical dispersion manufacture

**Curing agent, accelerators, fillers  
reduced to an average 5 microns or  
less in stationary grinding mill,  
before addition to latex compounds**

**FRANK E. McELROY**, Assistant Editor  
With **DR. EDWARD G. PARTRIDGE**,  
Senior Development Engineer  
and **VIRGIL MCGEE**, General Foreman  
The B.F. Goodrich Co., Adhesives Division  
Akron, Ohio

**Problem:** Mills being used for disper-  
sion manufacture at B. F. Goodrich Ad-  
hesives Division, Akron, Ohio, were not  
working out satisfactorily. They wore down  
and developed packing leaks, and also re-  
quired close watching by the operators.

This application requires grinding and  
dispersion of several tons per month of  
curing agents, accelerators, and fillers  
which are later incorporated into rubber  
latices, used as adhesives, or further pro-  
cessed into foams, dipped articles, and  
other rubber products. Final particle size

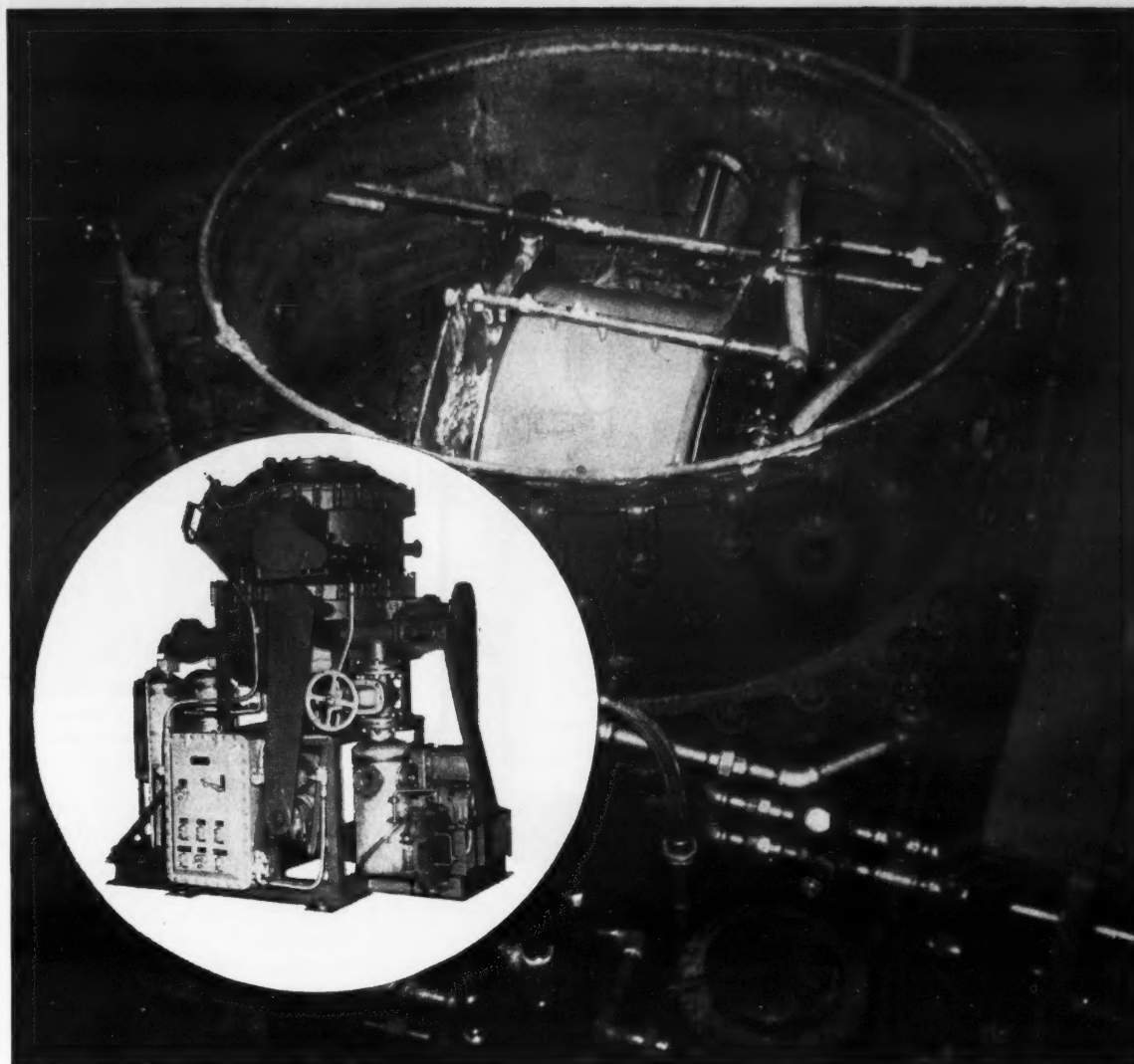


had to be an average of five microns or less, with few particles larger.

**Solution:** A former B.F. Goodrich engineer developed a machine to solve the problem. His device, called the Attritor, works like this (refer to Fig 2): A stationary jacketed tank is equipped with an agitator that has a number of arms inserted through it at right angles. A built-in pumping system maintains circulation during grinding and also may be used for charging and discharging the dispersion. Jacket permits temperature control by circulation of cooling or heating liquid. Tank is filled with pebbles or stainless steel balls. Apparatus has been patented in US and foreign countries.

B.F. Goodrich's Adhesive Division makes its dispersions by first charging the agents to these Attritors with an anionic or non-ionic surface-active agent and ammonia or fixed alkali (to raise pH). Grinding takes several hours and reduces particle size to an average of 5 microns. B.F. Goodrich keeps cooling water in the tank jacket and recycles the dispersion to keep it uniform. After dispersing, it transfers the material to a storage drum that is equipped with an agitator. The dispersion is later weighed out, and mixed with latex.

(Please turn to page 175)



## WE CAN'T SEND A SAMPLE

Eimco's Research and Development Center has the answer for the plants with difficult filtration problems. The engineers at the Center know that under certain product conditions it is unwise for the laboratory to try to reproduce plant conditions in which the sample was taken.

The alternate is to provide test equipment at job site suitable for wide range filtration problems. Eimco has designed several units similar to the unit shown above that can be used as standard drums, precoating drums, pressure drums and pressure precoating drums. These units are also equipped for washing and can use several types of cake removal attachments.

Eimco's experience in over half a century of service to process industries has given them the advantage of understanding filtration problems. The need for developing and producing numerous types of filtration equipment gives Eimco more opportunity to serve the customer's needs.

Eimco's objectives are: 1. To solve the customer's filtration problem successfully. 2. To recommend the most practical and economical equipment suited to the job, and, 3. To give a stand-by consulting service in securing maximum benefits from the equipment.

Yes! When you have a problem in filtration, Eimco can help whether or not you can send a sample.

## THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa



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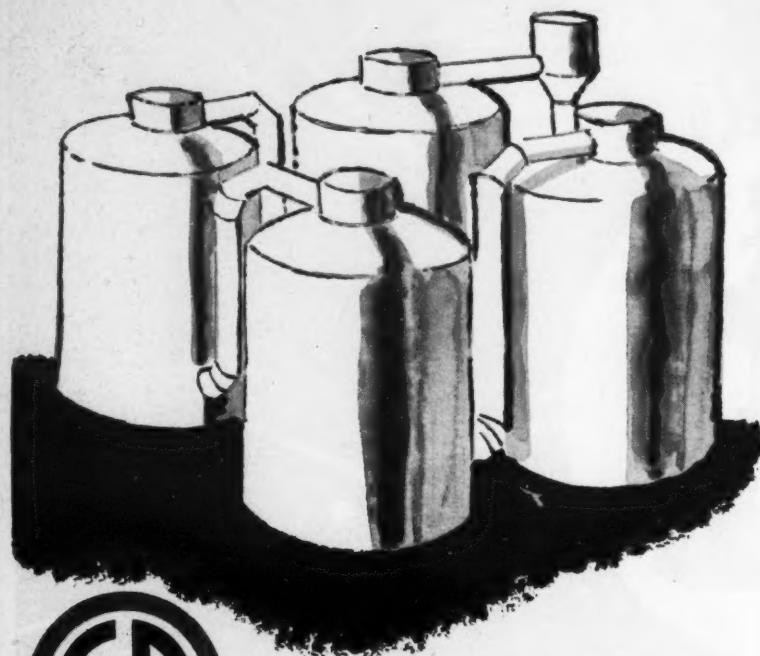




# Old Grand-Dad

**"HEAD OF THE BOURBON FAMILY"**

## USES



## QUADRUPLE EFFECT EVAPORATOR

This G-B built Calandria-type evaporator is used in the Old Grand-Dad distillery in Frankfort for processing distillery spent mash. Built of stainless steel and utilizing a natural circulation system, maintenance is held to an absolute minimum.

*Let G-B solve your evaporation problems. Our engineering staff is available for consultation at no obligation.*

**GOSLIN-BIRMINGHAM**  
MANUFACTURING CO., INC.  
BIRMINGHAM, ALABAMA

When inquiring check 7622 opposite last page

## PROCESSING

**Compact, mobile blender  
uniformly blends liquids,  
dry mixes**

**Uses:** Blending various dry ingredients with liquids.

**Features:** Blender is compact, mobile, and has low initial cost. Self-contained feeders add measured amounts of liquids and dry



Messrs. C. R. Veeck, J. T. Haigh, and L. S. Strong look over blender at sales meeting

ingredients into blending chamber. Liquids can be handled with viscosities varying from water consistency to that of heavy molasses.

**Description:** Liquid enters blending chamber through twin nozzles. Manually-adjusted slide gate regulates amount of dry mix entering unit. Signal light indicates presence or absence of dry mix flow.

Blending is accomplished by series of 25 paddles mounted at pre-set angle on rotating shaft. Entering at bottom of chamber, the material is gradually carried upward by the paddles to discharge end. Large clean-out door and drain plug provide easy cleaning.

Units are available with 5- or 7½-hp motors. Blender with large motor can mix from 3 to 7½ tons dry material per hour with up to one-third that amount of liquid (molasses).

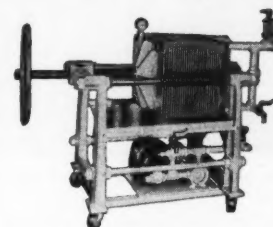
(Porta-Blend blenders are product of The Strong-Scott Manufacturing Company, Dept. CP, 451 Taft Street NE, Minneapolis 13, Minn. Check 7623 opposite last page.)

## ERTEL EQUIPMENT SERVES The CHEMICAL PROCESSING Industry



### ERTEL MODEL EFS FILTER

Designed for use with any type filtering medium. Uses 10 to 40 filtering surfaces 12"x12" square. Filter media creates its own gasket, thus rubber washers are eliminated. Nickel plated bronze or all stainless steel circulatory passages.



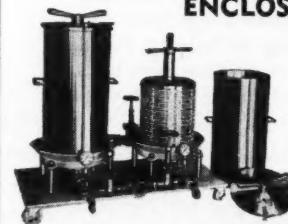
### EU MODEL UTILITY FILTER

Comparison and operation records prove this 16" square filter unmatched in performance. Fully described in catalog. Ask for your copy.

## ERTEL ASBESTOS FILTER SHEETS

Available in ten uniform grades for all filters up to 25" square. Manufactured under rigid control, they are acid treated to meet Ertel standards of low leachable calcium and iron content. As a double check, these pads are analyzed periodically by an independent laboratory . . . reports of these tests are available at any time. A complimentary set-up of these pads for your present filter is available upon request.

### ECD MODEL ENCLOSED DISC FILTER



Incorporates the outstanding feature of independent closing of filtering elements thus providing a positive seal. A unit built by engineers for trouble-free operation. Twin cylinder unit illustrated—also available with single cylinder for smaller capacities.

## ERTEL ENGINEERING CORPORATION

KINGSTON 3, NEW YORK  
Branch Office & Showroom Located in New York City

COMPLETE LINE OF  
**Liquid Handling Equipment**



When inquiring check 7624 opposite last page

CHEMICAL PROCESSING

## Attritors

(Continued from page 173)

Some carbon blacks, however, are still dispersed on a colloid mill. Such blacks require frequently only deflocculation. Mill is only used for these blacks and doesn't require thorough clean-out between batches.

**Results:** Good dispersions of 5 micron or less average particle size are obtained. The grinding rate for a given dispersion is about ten times that of conventional ball or pebble mills, and requires about  $\frac{1}{4}$  the power. Floor space required to produce a given amount of dispersion is also considerably less. B.F. Goodrich presently has Attritors ranging from 20 to 128 gal capacity, in addition to their lab-scale test units.

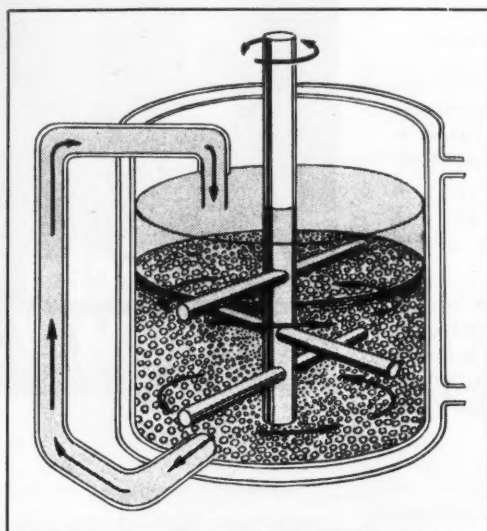
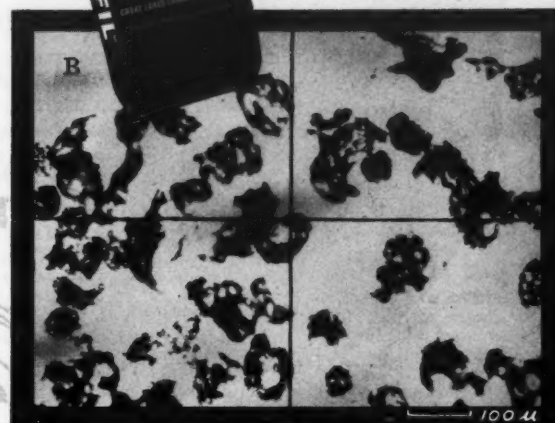
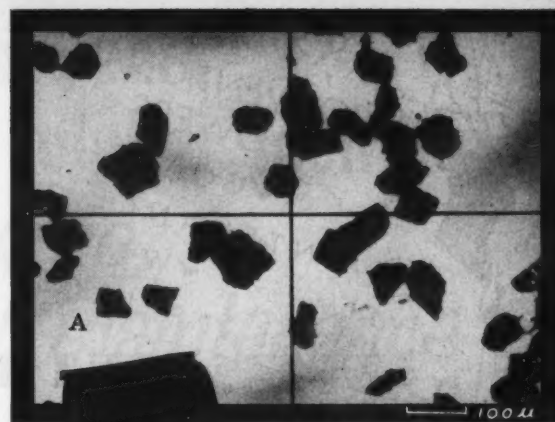


Fig 2—Schematic of grinding unit shows agitator, jacketed tank, and recirculating system

This grinding device permits small grinding pebbles to be used. Small pebbles or balls provide a much greater active surface for fine grinding. Pebbles or balls can be small because it is not their weight, but the externally-provided agitation that brings about their relative mechanical action.

If necessary, the material to be ground can be processed in the form of a rather heavy slurry, the specific gravity of which can exceed that of the grinding pebbles. Another possible advantage is that materials could be ground under an inert atmosphere, if so desired. As grinding tank is stationary, gas-tight conditions can be maintained.

(Attritors are products of Union Process Co., Department CP, 120 Ash Street, Akron 8, Ohio . . . or for more information reader may simply check 7625 on the convenient Reader Service slip which is located opposite last page.)



let's turn the microscope on **Nerofil**...

### the completely new Filteraid for use in strongly alkaline liquors—

The idea of using carbonaceous filteraids in processes involving caustics or fluorides is not new. But NEROFIL—a processed carbon-based filteraid—is completely new . . . and valuable because it overcomes the difficulties often encountered with earlier carbon materials.

(A) is a photomicrograph of a crushed carbonaceous material (quite similar to previous carbon filteraids). This, however, is merely the reactor feed from which NEROFIL (B) is made. Both photomicrographs are the same magnification. The marked differences are evident.

NEROFIL's success as a filteraid stems from two important features. First, of course, its physical and chemical stability . . . even boiling caustic has negligible effect. Second, the high filter cake porosity and low cake density of NEROFIL yield fast throughput of liquid and superior clarity of filtrate.

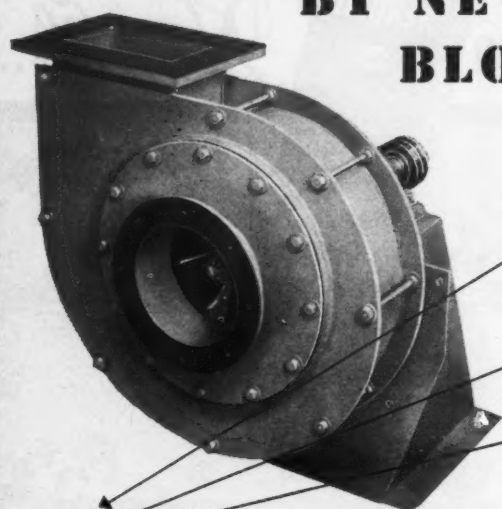
This stability and filtration efficiency have led several different industries to adopt NEROFIL in their processing, with excellent results. Complete information on NEROFIL is available to you in a new bulletin, just issued . . . write for it.

### Great Lakes Carbon Corporation

Nerofil Department — 612 So. Flower St., Los Angeles 17, Calif.  
Dept. LTK — 333 No. Michigan Ave., Chicago 1, Ill.

When inquiring check 7626 opposite last page





Designed by

**ipf**

CB 13 3/4  
Arrangement No. 1

If your problem is expelling corrosive fumes and gases, you need IPF Blowers. Ordinary blowers are susceptible to attack by these fumes and gases. Coating the blower is costly — and not foolproof. Maintenance and replacement costs are high . . . and valuable time is lost. Result — an expelling operation that eats into profits.

For trouble-free, long-life blowers, specify IPF blowers made of Unplasticized, Rigid Polyvinyl Chloride (UPPVC). UPPVC — the new construction material — exhibits inherent anti-corrosive qualities that allows IPF Blowers to withstand most chemical fumes and gases from 40°F to 140°F. Actual installations of IPF Blowers have lasted three times the normal life of ordinary blowers . . . and continue to function efficiently.

UPPVC is a lightweight . . . smooth surfaced . . . nonporous material of construction. Lightweight construction means greater capacity per B.H.P. . . . easier installation . . . reduced handling problems. Smooth, nonporous finish never require painting or maintenance expense. IPF Blowers are not subject to unbalance from chipping of a protective coating . . . because there is no coating. It's solid UPPVC.

IPF Blowers made of UPPVC are available in standard sizes that provide displacements from 143 C.F.M. to 7722 C.F.M. Standard wheel sizes of 9 1/2, 13 3/4, 19, and 27 inches. Other sizes and capacities can be custom designed to fit special requirements.

Full details on the new IPF Blowers available upon request.

Full details on the new IPF Blowers available upon request.

MANUFACTURED BY  
**Industrial Plastic Fabricators, Inc.**  
NORWOOD, MASS. NORWOOD 7-3411

When inquiring check 7627 opposite last page

## PROCESSING EQUIPMENT

### Tells how to select proper centrifugal

Four-page bulletin explains basic principles of clarification, separation, and concentration, and presents comprehensive listing of centrifugal separator applications. Cutaway diagrams illustrate and explain operation of individual bowl designs. Specific units are recommended in all three categories of centrifuging.

Bul 2173 is issued by Centrico Inc., Dept. CP, 75 W. Forest Avenue, Englewood, N. J. When inquiring specify 7628 on form opposite last page.

### Redesigned moving-belt filter has 40-gpm capacity . . .

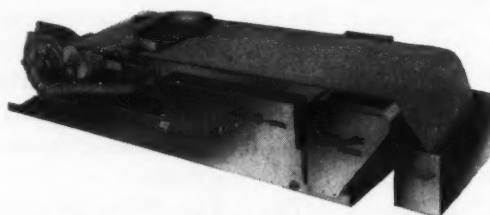
unit is self-cleaning, completely automatic

**Uses:** Although designed primarily for continuous vacuum filtration of coolants, redesigned filter has characteristics which may be useful in certain types of chemical or allied process work.

**Features:** Unit is completely automatic and self-cleaning. Compact filter can fit easily into relatively small areas. When used on coolants, capacity is about 40 gpm.

**Description:** Filter uses a specially-fabricated paper as its filtration medium. Paper is supported on an endless fabric belt which in turn is carried on a wire-mesh belt revolving on a chain-sprocket drive. Vacuum chamber is located directly beneath belt.

Material to be filtered flows by gravity from a baffled distributor onto filter paper directly over vacuum chamber. Material is uniformly distributed

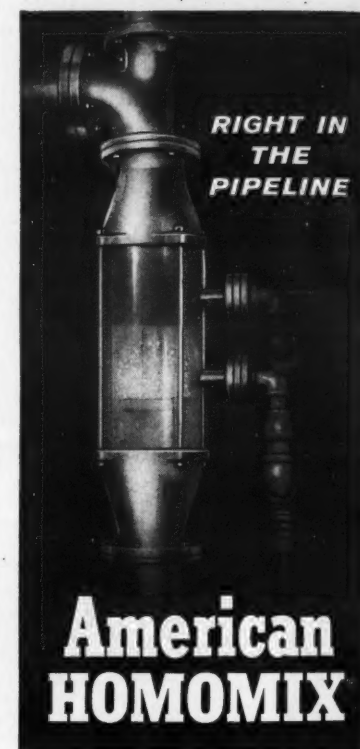


Filter has paper filter medium supported on endless fabric belt which is carried on wire-mesh belt driven by chain sprocket drive

over entire width of paper. Solution filters through paper into vacuum chamber, then drains into sump, from which it may be pumped to desired location.

Solids removed from solution are deposited on belt. When cake becomes so thick that suction can no longer be effectively maintained, belt is automatically indexed forward by a vacuum switch. This provides new filtering area. When unit in-

## CONTINUOUS LIQUID, GAS OR SLURRY CHEMICAL MIXING



### Gives instant, uniform, complete mixing without a mixing tank

Saves space, time and equipment. Simplifies and speeds the blending of one or more chemicals. Permits a wide range in the percentage of additives to base fluid and assures accurate, economical mixing control. Any number of diffusing stages can be selected. Provides for visual inspection of the mixing operation and access to diffusing impeller. Can be equipped with lift stage. Can be made of standard or special material and protectively coated. Easily installed in vertical, horizontal or inclined position. Wide range of sizes and capacities from 1 GPM to 15,000 GPM.

Send for Technical Supplement HM or for details on your application.

(Patented)  
IN OUR 88TH YEAR

**AMERICAN WELL WORKS**

Mixing, Pumping, Water & Waste Treatment Equipment

150 N. BROADWAY, AURORA, ILLINOIS  
Sales Offices: Chicago, New York, and other principal cities

When inquiring check 7629 opposite last page

CHEMICAL PROCESSING

dexes, previously collected material is discharged automatically into container at end of unit.

Filter measures 90" long, 20" high, and 31" wide. Shipping weight is approximately 980 lb. Filter paper is supplied in 200 yd rolls.

("Vac-40" Vacu-matic filter is product of Industrial Filtration Division, U. S. Hoffman Machinery Corporation, Dept. CP, 103 Fourth Avenue, New York 3, New York . . . or for more information check 7630 on form opposite last page.)

### Up to 350 tons per hour handled by crusher . . .

power requirement ranges from 150 to 250 hp

**Uses:** Crushing rock, ore, minerals, and other aggregate.

**Features:** Crusher has capacity of 350 tph of -3" aggregate, 275 tph of -2", and 150 tph of -1". Power requirement ranges from 150 to 250 hp.

**Description:** Crusher is a dual-rotor, up-running breaker, operating on multi-stage, triple-action reduction principle. Hammers are cast of manganese steel, having 6" face. Rotors have end



Crusher will accept any material passing through 36x48" feed opening

discs to prevent side liner wear. Crusher's interior is lined with 1½" cast manganese steel.

Crusher will accept any material passing through 36 x 48" feed opening. Low feed opening permits direct shovel loading in mobile operations and lower truck ramp height in stationary units.

Overall dimensions are: height, 8'-1/8" (with feed box, 12'-9 5/8"); length, 9'; width at sills, 5'-1", at shafts, 7'-4", width inside breaker, 3'. Approximate volume of reduction chamber is 130 cu ft. Basic weight of crusher is 34,000 lb — with feed box, 38,000 lb.

(Pioneer Cuber Senior, Model 3648, crusher is product of Pioneer Engineering Works, Inc., Dept. CP, 1515 Central Avenue, Minneapolis 13, Minn. . . . or for more information check 7631 on form opposite last page.)



## two years on sulphur melters... *and no* trap maintenance

On any steam trap installation, one of the big questions to be answered is, "What maintenance is needed?"

Yarway Impulse Steam Traps answer the question in a convincing way in this tough outdoor installation on sulphur melting coils at a midwest chemical plant of International Minerals and Chemical Corporation.

"No maintenance in 2 years of hard service," the operators say.

Yarways have many features that contribute to such trouble-free records in plants coast-to-coast.

- **STAINLESS STEEL CONSTRUCTION.**
- **ONLY ONE MOVING PART . . . A SMALL VALVE.**
- **GOOD FOR ALL PRESSURES WITHOUT CHANGE OF VALVE OR SEAT.**
- **WON'T FREEZE UP.**

In addition to all that, Yarways get equipment hot in a hurry and keep it hot.

Buy Yarway Impulse Steam Traps from one of 270 local Industrial Distributors. For name of one nearest you, also free trap bulletin and Piping Diagram and Trap Selector for chemical processing equipment, write . . .

### YARNALL-WARING COMPANY

125 Mermaid Avenue, Philadelphia 18, Penna.

### THERE'S A YARWAY IMPULSE TRAP FOR EVERY NEED



#### SERIES 60 and 120

For all normal trap requirements, pressures to 400 and 600 psi.



#### ½" No. 20-A

For light loads on tracer lines, steam mains, small presses, etc.



#### SERIES 40

For heavy loads requiring extra high capacity steam traps.



#### INTEGRAL-STRAINER HIGH PRESSURE TRAP

For high pressures, high temperatures. (Flanged or welding connections.)

# YARWAY

## IMPULSE STEAM TRAP

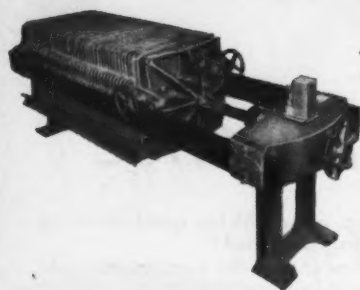
The Impulse that revolutionized steam trapping 20 years ago.

When inquiring check 7632 opposite last page



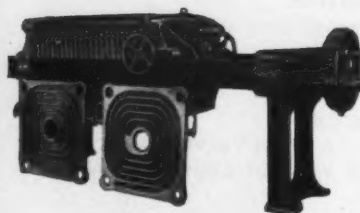
## SHRIVER DEVELOPMENTS

### Improve Unit Operations



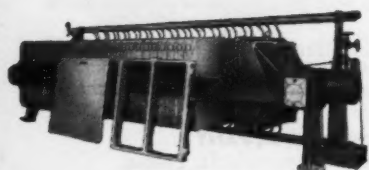
#### Filter Presses

The most versatile of all filters in range of types and capacities, to meet practically all conditions of operating pressure and temperature; required clarity and flow rate of filtrate; degree of filter cake dryness; ability to extract or wash cake; ability to use any textile, metal or paper filter media. Catalog 55.



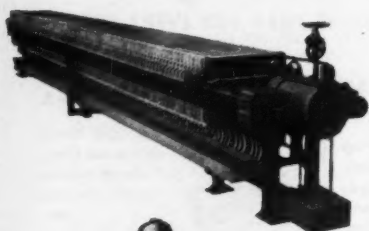
#### Continuous Thickener

Uses—Washing slurry to remove impurities, especially from slow-settling materials, saving considerable time and equipment. • Thickening prior to filtration. • Thickening instead of filtration. • Decantation involving "fines." "A lot of thickening in a small space." Bulletin 122.



#### Chamber Type Reactor

Polymerizes plastic resins at controlled rate of heating and cooling to produce multiple slabs of finished product of any desired size, 12" to 56" square, from 1" to 5" thick. Bulletin 142.



#### Wax Molding Press

Cools and molds paraffin or natural wax, or other substances, into multiple cakes of uniform size, weight and appearance, without shrinkage. Bulletin 127.



#### Diaphragm Pump

Cuts operating and maintenance costs in handling corrosive, abrasive, viscous, heavy or delicate fluids. Positive, double reciprocal piston pump requiring no packings (no leakage), easy to clean. Liquid pumping heads made of any required resistant material. Capacities to 100 gpm. Bulletin 137A.

Write for interesting literature

**T. SHRIVER & COMPANY, Inc.**

Filter Presses • Filter Media • Diaphragm Pumps

846 Hamilton St., Harrison, N. J.

Sales Representatives in  
Decatur, Ga.—Houston, Tex.—St. Louis, Mo.  
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When inquiring check 7633 opposite last page

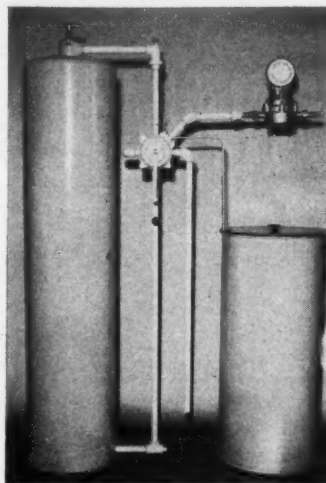
## PROCESSING

### Compact water softener has bell alarm . . .

rings when predetermined gallonage of water has passed

Uses: Furnishing relatively small quantities of soft water.

Features: Equipment is compact and simple to operate. Meter is wired to ring when predetermined gallonage of water has passed through.



Water softener has multiport valve, bell alarm meter, and brine tank as standard equipment

Description: Capacities range from 28,000 to 91,000 grains with synthetic gel zeolite, and from 54,000 to 180,000 grains when resinous ion exchanger is used. Tank sizes available are 10 x 54", 12 x 54", 16 x 54", and 18 x 54". Included as standard equipment is multiport valve, bell alarm meter, and brine tank.

(Water softeners are product of Elgin Softener Corporation, Dept. CP, Elgin, Illinois. Check 7634 on form opposite last page.)

Your guide . . . to more processing ideas and equipment is the alphabetical product directory beginning on page 261

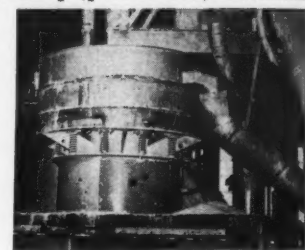
## SCREENING NEWS



### Colgate Puts 6 Tons/Hr. of FAB and VEL thru a 48" SWECO

Colgate-Palmolive, S. A., Mexico, D. F., the largest producer of detergents in Central America, now screens upwards of 6 tons per hour of FAB and VEL with a 48" dia. SWECO. The material is conveyed directly to a special feeder over the center of the SWECO Separator. Oversize and lump (plus 8 mesh) materials are returned to processing for 100 per cent recovery, while minus 10 mesh product is conveyed to the Packing Department.

Production Control reports improved uniformity, throughput beyond anticipated capacity, and a sharp drop in maintenance costs. Customer comment: "... results are highly satisfactory."

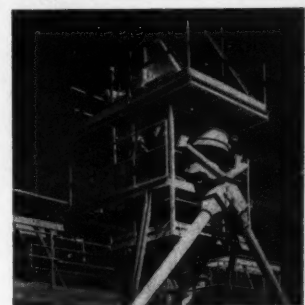


COLGATE DETERGENT SCREENING operation in Mexico City Plant. Plus 8 mesh material is reprocessed; minus 10 is packaged.

### SWECO Eliminates Screen Blinding— Cleans Catalyst Pellets for Filtrol

Filtrol Corporation, Salt Lake City, Utah, had been using a conventional rectangular shaker screen to remove "fines" from extruded catalyst pellets. Maintenance was high due to screen blinding and the difficulty of cleaning the equipment.

The Company now obtains high capacity output from its 48" dia. SWECO Vibrating Screen Separator. The Separator cleans all "fines" from finished TCC grade pellets without blinding.



FILTROL'S CATALYST CLEANING SWECO can be lightly mounted "upstairs." There is no imparted vibration to substructure.

#### Free screening analysis and recommendations . . .

Your nearby SWECO District Engineer is available to help you with special screening problems. His know-how covers 241 different materials . . . wet or dry, coarse or fine, heavy or light.

#### SEND FOR DATA FILE 65-3

Detailed information on high-efficiency, low-cost applications of SWECO Screen Separators.



**SOUTHWESTERN  
ENGINEERING  
COMPANY**

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Engineers and Constructors . . . Manufacturers

When inquiring check 7635 opposite last page

CHEMICAL PROCESSING

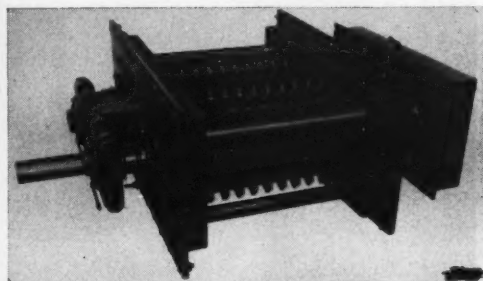
**Wet or dry materials handled efficiently  
in rugged double-roll grinder . . .**

designed for use in material handling systems,  
can be installed either above or below ground

**Uses:** Sizing solid materials conveyed in material handling systems.

**Features:** Unit is designed for heavy-duty loads. Grinder rolls are made of manganese steel. Grinder can handle either wet or dry material and can operate with rolls submerged.

**Description:** Double-roll grinder is designed for installation in sump, located either below or above floor level. Teeth on rolls are integrally cast, and individual ones can be replaced, when worn, by being burned off and new ones welded in their place. Two steel angle mounting frames



Grinder's rolls are made of manganese steel. Individual teeth can be replaced when worn

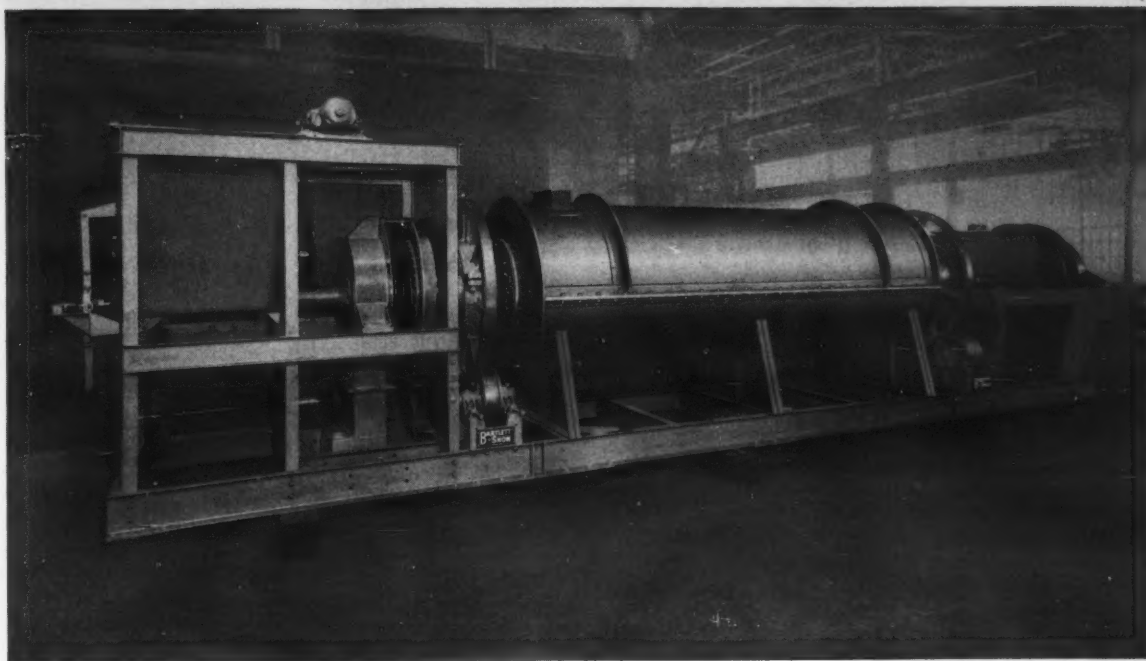
support rolls with their shafts and bearings. Fabricated steel housing protects bearings from water in sump in installations below floor level. In installations above floor level, bearings are located outside sump.

(Sump-type double-roll grinders are product of The Allen-Sherman-Hoff Company, Dept. CP, 259 E. Lancaster Avenue, Wynnewood, Pa. . . . or for more information reader may simply check 7636 on the convenient Reader Service slip which is located opposite last page.)

**why is this magazine so "different"?**

Maybe you have wondered why this magazine, **CHEMICAL PROCESSING**, has such an unusual format? Or why its articles are so terse, short, to-the-point?

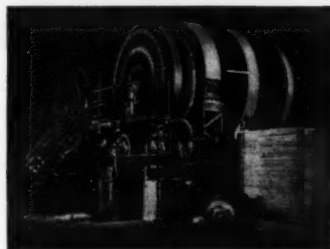
The Editors explain how this benefits you—page 100.



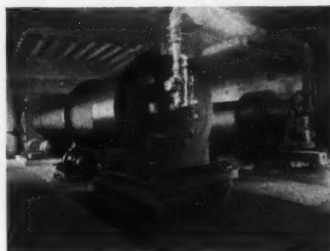
## continuous *Calciner and Cooler*

**. . . permits materials to be processed continuously at temperatures from 900° F to 2100° F in a reducing, oxidizing or neutral atmosphere, cooled, and discharged at 200° F or lower.**

• The chrome nickel alloy tube can be lined if desired, to permit processing without bringing the material into contact with metal at elevated temperatures. Feed hopper, variable feeder, seals and breechings are all supported on a single frame to assure proper alignment and efficient trouble-free operation. Our complete laboratory facilities enables us to determine accurately the time cycle, temperature, special atmosphere and other conditions needed to produce a given result, before the production unit is designed or built. Let us work with you on your next job!



Two Bartlett-Snow Rotary Oil-Fired Batch Kilns Pre-heating Charges for Electric Furnaces.



Two Oil-Fired Continuous Kilns Working Temperature 2300° F.

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**DRYERS • COOLERS • CALCINERS • KILNS — Complete Facilities Including Materials Handling**

When inquiring check 7637 opposite last page



# WAUKESHA

## can provide you with finished CORROSION-RESISTANT CASTINGS

**to help solve your tough product design problems**

### COMPLETE FOUNDRY FACILITIES

#### ENGINEERING



The design sets the pattern for a sound casting solution.

#### FOUNDRY



Waukesha is noted for skilled craftsmanship in the foundry.

#### RESEARCH



Waukesha metallurgists have solved many difficult problems.

#### MACHINING



Large modern machine shop to complete your castings to finished specifications.

#### PATTERN MAKING



Skilled personnel for all types of patterns.

#### POLISHING



Polishing department for castings requiring mirror finish.

#### MOLDING



Precision molding guarantees quality castings.

#### QUALITY CONTROL



Metallurgical, structural, and dimensional checks are the key to quality castings.

Waukesha has complete foundry facilities and services to provide you with "top-quality" corrosion-resistant castings... engineered to meet your product requirements... produced to the functional needs of your design. Waukesha castings meet your products' need for resistance to corrosion plus resistance to heat, stress loads, non-magnetic requirements, resistance to galling or seizing, as may be required.

Quality Waukesha castings are available from a wide range of stainless steel alloys, "Waukesha Metal" (a copper base, high nickel content alloy), and other non-ferrous metals: Monel, pure nickel, Everdur, and aluminum, among others. Waukesha castings meet your needs for machineability, weldability, bearing qualities, and durability.

Waukesha castings • lend themselves to easy assembly line handling because they can be delivered to you in a finished state • designed and cast to require a minimum of machining and polishing, thereby reducing costs • are completely inspected and tested to meet design specifications.

Write, today, for a casting quotation.  
Waukesha Foundry Company, 5623 Lincoln Avenue,  
Waukesha, Wisconsin.



Waukesha operates three distinct and separate foundries in two, large, modern plants to meet your production requirements

**Waukesha**  
Foundry Company

WAUKESHA, WISCONSIN

WAUKESHA: SPECIALISTS IN CORROSION-RESISTANT CASTINGS FOR ALL INDUSTRIES

When inquiring check 7638 opposite last page

### PROCESSING EQUIPMENT

**Uniform dispersions achieved  
with homogenizer...**

can be used for a wide variety of applications

**Uses:** Unit can be used for dispersing various colors in aqueous vehicles. Dispersion quality can meet requirements of latex and water emulsion paints as well as satisfy the exacting specifications for colors used in spin dyeing of textile fibers. Dispersions can also be made for leather finishes, vinyl printing inks, aniline inks, architectural enamel, industrial enamels, and lacquers.



Pumping assembly of disperser is fabricated from stainless steel

**Features:** Homogenizer provides uniform dispersion in either batch or continuous operation. It permits maximum color and strength development. Automatic recycling is available for ultra-fine dispersions. No air is incorporated in processing.

**Description:** Sub-micron disperser is combination of a high-pressure pump and dispersion valve. Pumping assembly is stainless steel. Pigment feed is drawn into pump cylinder, pressurized at 5000 to 8000 psig, then discharged through assembly. Pressurizing, in addition to providing force to move material at high velocity through disperser valves, allows vehicle to wet pigment by compressing adsorbed air in or on the pigment agglomerates to 1/530 of its original volume.

Pigment, with air still in compressed state, enters disperser valve where there is an instantaneous pressure drop to atmospheric. At this time there is a corresponding instantaneous acceleration of flow to a velocity as high as 57,000 ft per minute. At this velocity three actions take place: 1) extreme turbulence, cavitation and shear, 2) rapid expansion of gas within pigment cluster, causing explosion of particles, 3) shattering impact against

## PROCESSING EQUIPMENT

ring surrounding orifice. Unlike conventional equipment which may depend upon internal shear, this unit utilizes a high velocity shear.

No air is incorporated during processing. No special foundation is required for unit. It can be mounted on casters for movement to desired plant location.

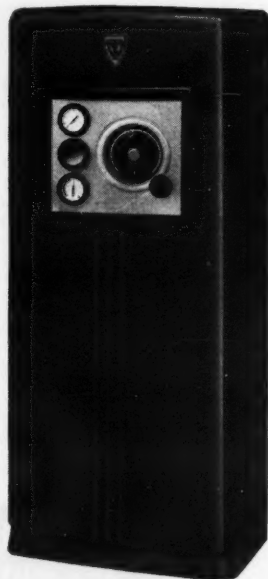
(Sub-micron disperser is product of Manton-Gaulin Manufacturing Co., Inc., Dept. CP, 44 Garden Street, Everett 49, Mass. . . or for more information check 7639 opposite last page.)

### **Metering system on chlorinators gives $\pm 4$ percent accuracy over wide feed range . . .**

units have capacity of 25 to 2000 pounds per 24 hours

**Uses:** Metering chlorine gas into various processes.

**Features:** Chlorinators are constructed entirely of corrosion-resistant materials. Units feature new metering and controlling principle — the V-notch variable orifice — which gives smooth feed control with  $\pm 4$  percent accuracy.



Chlorinators are constructed entirely of corrosion-resistant materials

**Description:** Heart of chlorinator control system is cylindrical plug positioned inside a precisely fitted ring.

A V-shaped groove about 3" long starts near one end of plug and gradually enlarges to its maximum width and depth at other end. The V-notch orifice is formed at intersection of grooved plug and ring. Orifice area is varied simply by positioning plug inside ring.

Chlorinators are available in two models: Series A-712 and A-711.

Former has direct-reading dial covering 20-to-1 feed range. Other model has rotameter with 10-to-1 feed range. Capacity for either series is 25 to 2000 lb per 24 hr.

(Chlorinators are product of Wallace & Tiernan Incorporated, Dept. CP, 25 Main Street, Belleville 9, N. J. Check 7640 opposite last page.)

# Hundreds of drying problems . . . **SOLVED BY LOUISVILLE**

chemicals	pharmaceuticals
brewery by-products	cork products
plastics	corn and soybean products
distillery by-products	foods and feeds
fishing industry by-products	meat packing by-products
fertilizers	

Only Louisville Dryers dry so many things so well. Sounds boastful, but only Louisville has the diversified experience . . . the facilities and the personnel to design and build dryers that are right for so many jobs.

If the manufacture of your product involves a

drying process, it will pay you to call in a Louisville engineer. He can show you how a Louisville Dryer, "tailored" to your need, can speed up production, improve your product and save you money. Call or write today—there's no cost or obligation.



### **Louisville Drying Machinery Unit**

## **GENERAL AMERICAN TRANSPORTATION CORPORATION**

*Dryer General Sales Office:* 139 So. Fourth Street, Louisville 2, Kentucky

*Eastern Sales Office:* 380 Madison Avenue, New York 17, New York

*General Offices:* 135 So. La Salle Street, Chicago 90, Illinois

*In Canada:* Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada

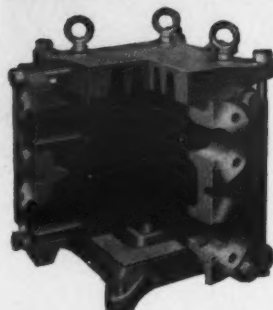
When inquiring check 7641 opposite last page



# ONLY *Impervite* Gives You All Basic Designs Of IMPERVIOUS GRAPHITE HEAT EXCHANGERS

## CUBICAL

Provides greatest amount of transfer surface possible for size of exchanger. (Example: Model 4 can provide 50 sq. ft. on one side and 90 on the other). This IMPERVITE exchanger can be operated up to 150 psi, 340° F. They can be easily modified to permit change of application, and special interconnectors allow economical use of banks of CUBICAL exchangers.



## TUBE AND SHELL

You can get quick shipment on famous standard IMPERVITE tube and shell exchangers in sizes from 7 to 650 tubes, 9 and 12 ft. in length. In addition, flexible design and production facilities at Falls Industries enables custom units to be fabricated quickly and economically for practically any application.

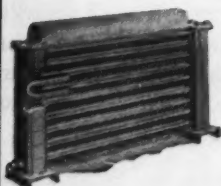


Design of these exchangers is such that corrosives only come into contact with IMPERVITE impervious graphite. This material is unaffected by the action of all corrosives except a few highly oxidizing agents, is immune to effects of thermal shock, and possesses an exceptionally high rate of thermal conductivity. An extensive variety of standard and special IMPERVITE processing equipment is available from Falls Industries for long-life, corrosion-free service.



## CROSSBORE

This new exchanger design is an exclusive Falls' development, which incorporates a "one-piece" bundle. It withstands operating pressures in the 150-200 psi range, resists greater physical shock, and is exceptionally easy to clean. Extreme simplicity of design provides truly maintenance-free operation.



## CASCADE

All models utilize specially constructed low-pressure-drop cells. All tubing is extruded by an improved method which practically eliminates spalling at high temperatures and results in more uniform heat transfer characteristics.

WRITE FOR CATALOGS

# Falls Industries Inc.

31909 AURORA ROAD • SOLON, OHIO  
PHONE: CHURCHILL 8-5357 • TELETYPE NO: Solon 0-720

When inquiring check 7642 opposite last page

## PROCESSING

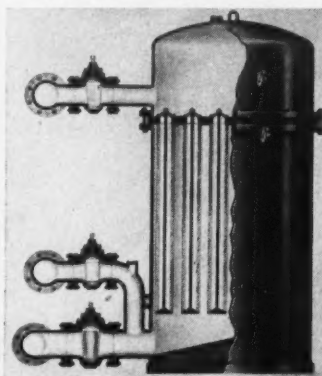
Backwash design featured  
on new line of filters . . .

eliminates need for disassembly when cleaning unit

Uses: Various filtering applications in chemical and allied fields.

Features: Backwash design eliminates need for disassembling unit for cleaning.

Description: New line of filters is available in five basic sizes. Units can be used in multiple



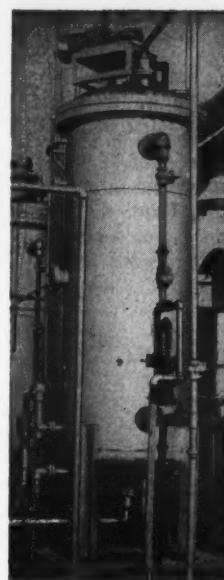
Cutaway shows interior of new line of filters. Air trapped in high dome forces backwash liquid through filter elements when backwash valve is open

arrangements in either batch or continuous operations. Porous filter elements are available suitable for most process needs.

Backwash design is same as that incorporated in manufacturer's line of WFF filters. In this design, a compressed air head is developed in the high dome of the filter shell. Air acts as dynamic force which drives backwash liquid in reverse direction through filter elements when backwash valve is open. High initial backwash flow rates are obtained because the compressed air is acting on the entire surface area of the backwash liquid.

(IWF filters are product of R. P. Adams Co., Inc., Dept. CP, 343 East Park Drive, Buffalo 17, N. Y. . . or for more information reader may simply check 7643 on the convenient Reader Service slip which is opposite last page.)

# Efficient/Practical SOLVENT EXTRACTION AT LOW COST



The York-Scheibel multi-stage extraction column is ideal for simple counter-current extraction; and for fractional liquid extraction in which the feed material is simultaneously contacted by two selective and immiscible solvents.

Check these features . . .

- POSITIVE MIXING
- POSITIVE PHASE SEPARATION
- SINGLE, COMPACT COLUMN
- HIGH THROUGHPUT CAPACITY
- HIGH EFFICIENCY
- LOW STAGE HEIGHT
- LOW COST PER STAGE.

# YORK

YORK PROCESS EQUIPMENT CORP.

4 Central Avenue  
WEST ORANGE, N. J.

Complete illustrated catalog available describing laboratory, pilot plant and large scale extraction columns.

When inquiring check 7644 opposite last page



## 7-WAY ACTION

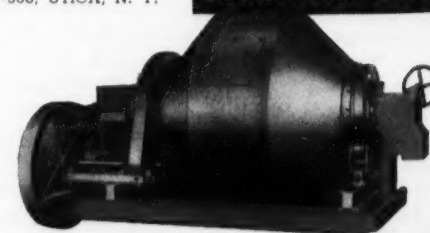
...for  
better,  
faster  
blending

It lifts . . . blends . . . mixes . . . seven ways, assuring faster, more accurate blending of dry ingredients. Empties completely. Will not grind or reduce particles. Ideal for blending of fertilizers, insecticides, fibrous materials, pharmaceuticals, atomic materials, chemicals, and a wide variety of other ingredients. Can be fitted with internal liquid spray pipe. Gravity intake and discharge with no internal bearings for free-flowing materials.

For details write to:  
MUNSON MILL MACHINERY CO.  
Dept. P-956, UTICA, N. Y.

# MUNSON

ROTARY BATCH MIXER

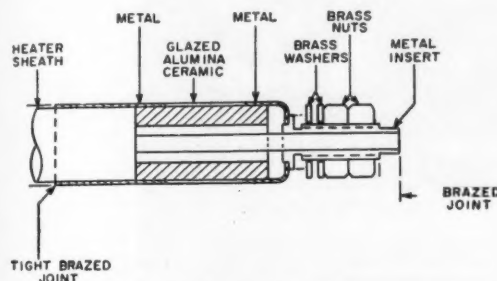


When inquiring check 7645 opposite last page

CHEMICAL PROCESSING

## Ceramic-to-metal seals protect heaters from oils, water and gases

Tubular and tubular-finned heaters are now available having ceramic-to-metal seals. Offered as optional equipment, the seal is designed to prevent contact of oil, moisture, carbonaceous fumes, halogen gases, and other chemical fumes with the heating element. Seal consists of impervious alumina ceramic. A special process bonds the ceramic to the metal parts, and entire seal is brazed to the tubular sheath.



Ceramic-to-metal seals on tubular and tubular-finned heaters can be used in temperatures up to 1000°F in inert atmospheres, 750°F in air

Because the expansion coefficient of the ceramic matches that of the metal parts, the seal flexes with the metal as it heats. It can be used in temperatures up to 750°F in air and 1000°F in inert atmospheres. Unit will withstand reduction from 400°F to 70°F by immersion in water and from 800°F to 70°F by air cooling. Seal will withstand up to 4000 psi liquid pressure.

(Heaters with ceramic-to-metal seal are product of Industrial Heating Department, General Electric Company, Dept. CP, Schenectady 5, New York . . . or for more information check 7646 opp. last page.)

### Catalog describes German-made high-pressure apparatus

German manufactured high-pressure apparatus is subject of 52-page catalog. Text covers all aspects of equipment, including design, construction, operation, etc. Photographs and drawings illustrate autoclaves, magnetically-operated agitators, and other devices. Separate section is devoted to discussion on vessel closures.

"High-pressure Apparatus" is issued by Chemtech Products Corp., Dept. CP, 276 Forest Ave., Glen Ridge, N.J. When inquiring specify 7647 on form opposite last page.

## for a New DENSITY HIGH in Concentrating Heat-Sensitive Liquids *Use a Buflovak* **ROTO-VAK** *Concentrator*

It provides these PROFIT-BUILDING features:

- High concentration of a wide variety of heat-sensitive, viscous and foamy food products and chemicals
- Sterilization combined with concentration
- Increased capacity
- Lower operating cost
- Simplicity of operation
- Ease of cleaning
- Dependable, uniform results, with original qualities of the product retained

The Buflovak ROTO-VAK Concentrator employs the single pass, downflow principle, plus positive agitation. The combination gives entirely new results, with concentrations of many liquids carried to higher densities than can be satisfactorily accomplished in conventional type evaporators, retaining or improving desirable quality of the concentrated product.

The ROTO-VAK is extremely flexible, operating successfully through a wide temperature range and safely and effectively performing sterilization along with concentration.

We will be glad to test your product on a semi-plant scale with our laboratory model ROTO-VAK Concentrator in the Buflovak Research Laboratory and Testing Plant. Complete information on request.

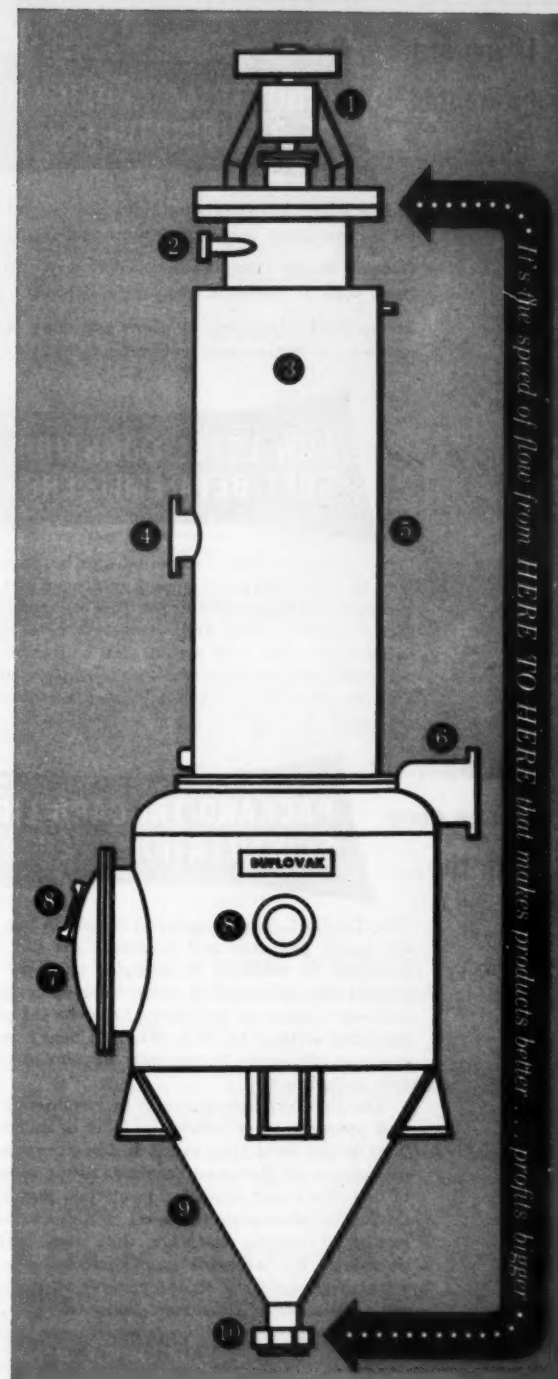
ASK FOR BULLETIN NO. 369



## BLAW-KNOX COMPANY

Buflovak Equipment Division, 1645 Fillmore Avenue, Buffalo 11, N. Y.

When inquiring check 7648 opposite last page



(1) ROTOR DRIVE (2) PRODUCT INLET (3) INTERNAL VAPORIZATION TUBE (equipped with rotor to increase heat transfer) (4) STEAM INLET (5) EXTERIOR HEATING SECTION (6) VAPOR OUTLET (7) QUICK OPENING DOOR (for easy cleaning) (8) OBSERVATION GLASSES (9) CONE BOTTOM (10) FINISHED PRODUCT OUTLET (no recirculation)



If you are  
interested  
in.....

## INDUSTRIAL APPLICATIONS OF RADIOISOTOPES

**Tracer Research** involving industrial organic compounds—oil and gasoline, solvents, pharmaceuticals, plastics.

**Ground Water Studies**—large scale water distribution problems, such as pollution and waste disposal.

**Large Scale Tagging** of plant operation with safety and economy of radioactive materials.

You  
should  
consider...

## LOW LEVEL COUNTING OF SOFT BETA EMITTERS

Every single organic compound can be uniquely identified with the radioactive isotopes of hydrogen and carbon. These isotopes—Tritium and Carbon-14—are readily available and simple to use. They emit very soft beta radiation which cannot penetrate even a thin glass container.

Sulphur-35 and Calcium-45 are other common soft beta emitters now being successfully used in wide industrial applications.

See what  
can be done  
with the...

## PACKARD TRI-CARB LIQUID SCINTILLATION SPECTROMETER

The Tri-Carb Spectrometer is simple to use. Most samples are easily prepared and hundreds per day can be readily handled. In addition to samples that are soluble in the scintillation solvent, it is also possible to count many entirely different classes of materials. Aqueous samples, completely insoluble solids,  $\text{CO}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{SO}_2$ , and heavy metals can all be counted efficiently by recently developed sample preparation techniques.

The Tri-Carb Spectrometer makes possible the labeling of end products at or below the level of natural radiocarbon. This is the level that exists in the atmosphere and consequently in all plants and animals living today. As a matter of fact, the liquid scintillation method permits archeological dating by measuring the level of radiocarbon remaining in preserved organic materials that were living over 40,000 years ago. For industrial applications the use of equipment with this sensitivity should remove all objections to radioactive labeling of consumer products.

Request Tri-Carb Bulletin for general data.  
For specific information on your requirements,  
give us details of your application.



**Packard Instrument Company**  
DEPT. E • P.O. BOX 428 • LA GRANGE, ILLINOIS

When inquiring check 7649 opposite last page

for the laboratory

## SIMPLIFIES MIXING SCALE

unit with 22 impellers provides flexibility,  
speed — gives reproducible results



Complete agitator kit in storage case. Note 22 impellers

**Uses:** As experimental bench-scale pilot plant mixer to determine agitation requirements for specific process operations — by reducing number of variables and allowing collection of data for large scale design.

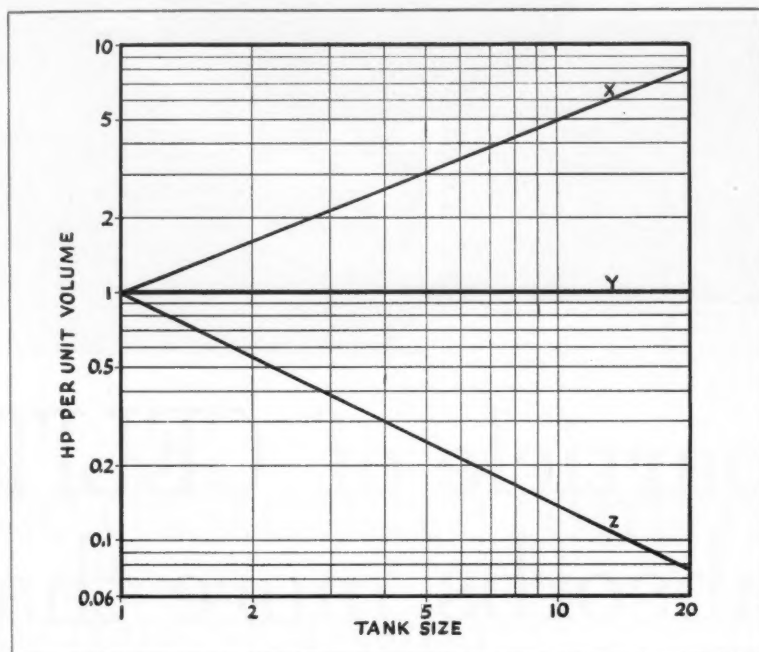
**Features:** Experimental agitator in developmental kit has a specially-designed drive, consisting of constant speed motor and variable speed transmission with output from 0 to 1100 rpm. Linear dial-speed relationship is provided by micrometer control. Kit includes 22 calibrated impellers to cover wide range of fluids and fluid mixing problems.

**Description:** "Do-it-yourself" approach of experimental agitator kit is designed

for scale-up of small scale fluid agitation problems *without* losing geometric, kinematic, or dynamic similarities. Unit was designed to study particular mixing problems, as an extremely flexible tool in a pilot plant process. Job of studying mixing applications, including problems of selection of commercially available standard size agitators, can be simplified, more convenient, and less costly.

Basis for scale-up, assuming all fluid properties remain constant and only batch size increases, is complete set of calibration curves furnished with each kit of fifteen turbines, five propellers, and two paddles. Handbook is also furnished which discusses factors in scale-up and

# NG SCALE-UP PROBLEMS



Power per unit volume nomograph for equal process result (Figure 1)

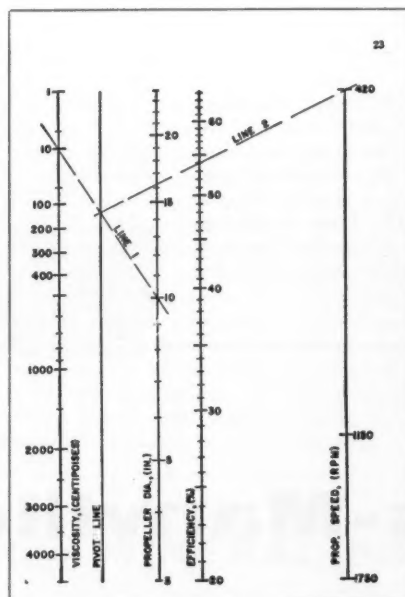
Propeller circulation efficiency nomograph (Figure 2)

details each step.

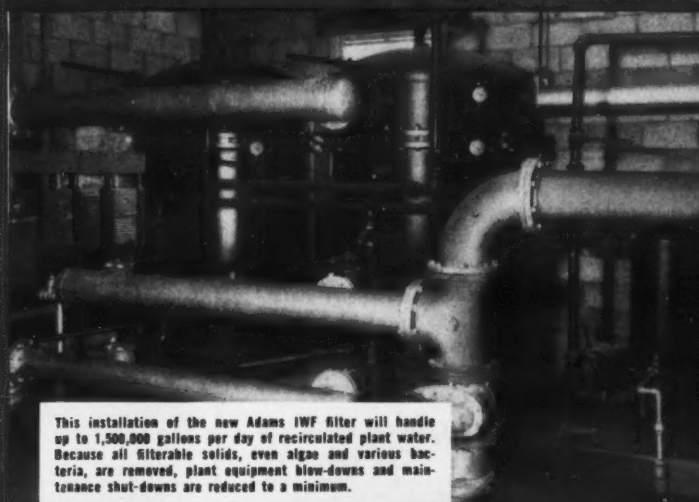
Approach to mixing problems, once engineers have assembled pertinent data, reduces to necessary impeller performance requirements-hydraulics, and process requirements-energy. Nomographs have been built to quickly answer problems of scale-up and are included in handbook.

One typical method of correlating data for scale-up, described in handbook, is to use geometric similitude and index to indicate conditions required to give equal process results. Method is useful for all types of impellers. Possible indices are impeller peripheral speed, Reynolds Number, and horsepower per unit volume.

(Please turn to next page)



## Announcing . . .



This installation of the new Adams IWF filter will handle up to 1,500,000 gallons per day of recirculated plant water. Because all filterable solids, even algae and various bacteria, are removed, plant equipment blow-downs and maintenance shut-downs are reduced to a minimum.

## the NEW ADAMS IWF Industrial Filter

### For applications in:

- Process Water
- Coolant Water
- Make-Up Water
- Secondary Recovery
- Boiler Feed
- Bearing Water
- Potable Plant Water
- Waste Water Disposal
- Process Gases

Adams IWF filters are available in a wide range of sizes and multiple combinations. Cleaning is accomplished without disassembly by the unique Adams HI-FLOW backwash design.

The new IWF is only an addition to an extensive line of Adams filters. So, if you have any filtering problem, fill in the coupon below for further information and help.

## R. P. ADAMS CO., INC.

243 East Park Drive • Buffalo 17, New York

### In Our Twentieth Year of Service to Industry

R. P. ADAMS COMPANY, INC.

243 East Park Drive, Buffalo 17, N. Y.

We have a filtration problem. Please have your local representative call on us.

Name.....Title.....  
Firm.....  
Street.....  
City.....State.....

When inquiring check 7650 opposite last page



**Agitator Kit***(Continued from preceding page)*

Handbook suggests hp/volume is preferable. It is least sensitive to variables as batch depth, amount of baffling, and impeller characteristics. Also, experimental runs in only two batch sizes are required since a logarithmic plot yields a straight line. Typical process results would be heat transfer coefficient, blend time, iodine number, pH, and others.

If process result is well-defined and easily determined value, log plot similar to Figure 1 will be sufficient. Three typical curves are given: curve Y indicating constant horsepower/volume; curves X and Z indicating commonly obtained plot.

Another useful nomograph, Figure 2, which can be applied to either laboratory or full scale calculations correlates propeller circulation with variables affecting it. With fluid viscosity of 10 centipoises, propeller diameter 10", and speed of 420 rpm, propeller efficiency can be calculated to determine pumping capacity.

Connect 10 on Viscosity scale with 10 on Propeller Diameter scale. Note intersection on pivot line. Connect intersection with 420 rpm. Read Propeller Efficiency, 54%, where line 2 intersects Efficiency scale.

Fifteen turbines supplied in kit range in diameter from 2 1/2" to 4", and are conventional straight, pitched, and curved blade styles. Five propellers, from 2 1/2" to 4", are three-blade square pitch modified marine models. Two 9" diameter paddles are reverse pitch design. All impellers are type 316 stainless steel.

Motor on agitator drive is 1/4 hp, totally enclosed and operating on single phase, 115 or 230v AC. Variable-speed transmission is integral with motor. Weight of motor and variable-speed drive is approximately 40 lb. Aluminum flange is attached to drive assembly for vertical mounting on tanks. Three lengths of 316 stainless steel shafting are furnished. Swivel clamps for off-center mounting, tachometer kits, special impellers are available.

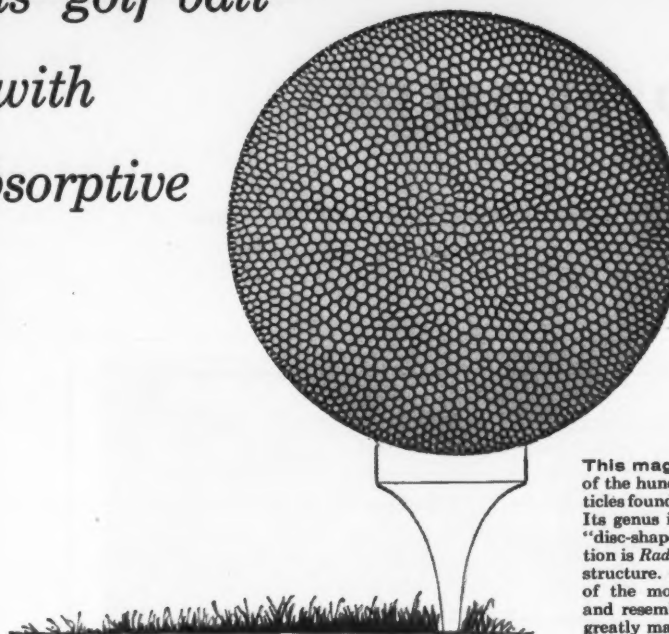
(Experimental Model ELB agitator is product of Chemineer, Inc., Dept. CP, 1044 East First Street, Dayton 3 Ohio. Check 7651 opposite last page.)

**Details constant-temp lab ovens**

Including a temperature conversion table, booklet of 22 pages details constant-temperature laboratory ovens using mechanical and gravity convection. Construction, temperature range, controls, insulation, and accessories are described.

Cat No. 56 is issued by AC-Lab Equipment Company, Dept. CP, 673-675 Timpson Place, New York 55, N. Y. Specify 7652 opp. last page.

*What's this "golf ball"  
got to do with  
greater absorptive  
capacity?*



This magnification shows just one of the hundreds of different shaped particles found in Celite diatomaceous earth. Its genus is *Coscinodiscus* which means "disc-shaped sieve." Its species designation is *Radiatus* which refers to its radial structure. *Coscinodiscus Radiatus* is one of the more common marine diatoms and resembles a "golf ball" only when greatly magnified.

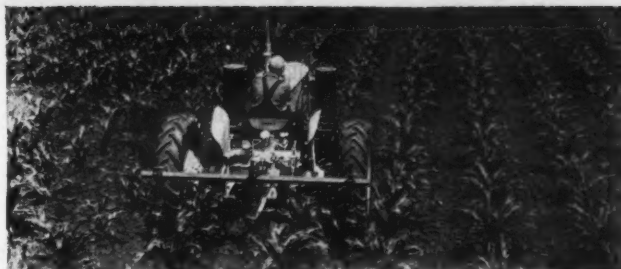
# It's a particle of CELITE that absorbs more than

The secret of diatomite's remarkable properties is shown in this photomicrograph. The infinite variety of particle shapes and sizes gives Celite diatomite its exceptional performance characteristics in a wide range of process applications. The large percentage of voids both between and within particles like the "golf ball" provide porosity for high absorption.

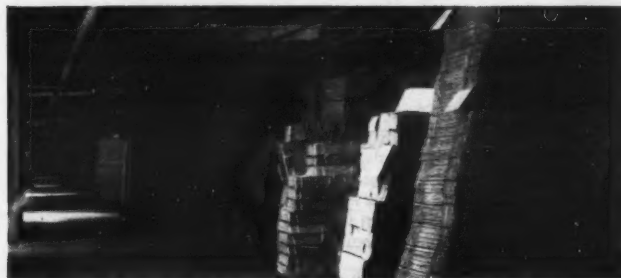


## Johns-Manville CELITE

Helps polishes soak up oil and dirt. It polishes for silver, other metals, glass and airplanes as well as automobiles. Celite absorbs residual oil, dirt and other solid matter. In addition, Celite imparts a delicate non-scratching polishing action.



Provides free-flowing fertilizers for uniform coverage. In ammonium nitrate fertilizers, highly absorbent Celite particles form a protective coating which helps prevent contact between crystal faces... thereby minimizing caking and assuring good flowability.



Controls viscosity in adhesives for corrugated paper. For precise control of viscosity and surface penetration, manufacturers of many types of adhesives rely on Celite's excellent absorptive capacity.

## -the diatomite mineral filler twice its weight of liquid

Mix 100 cc of water with 100 grams of Celite\*... the water is so completely absorbed that the mixture exhibits all the properties of a dry powder. This demonstration is visible proof of the high absorptive capacity of Celite diatomite fillers. Actually it will absorb 2 to 3 times its own weight before reaching its liquid holding limit. The reason is that approximately 93% of a given volume of Celite is composed of air spaces or voids. Despite its highly porous nature, however, Celite does not absorb moisture from the air.

In addition, Celite has many other unique properties which give it wide application as a mineral filler. Its high bulk—a cubic foot weighs only ten pounds—reduces outage in packaged powder products and provides the needed bulking action in many other formulations. The irregular shape of the particles and their hard silica structure adds reinforcing strength to paints and plastics. Other uses include concrete, insecticide diluent, paper and as a source of silica in "water glass" and "lime-silica" insulating materials.

Produced from the world's purest commercially available diatomite deposit, Celite comes in a wide range of grades. Each grade is carefully controlled for complete uniformity.

Ask your nearest J-M Celite engineer to tell you how Celite can help solve your formulation problems. He's backed by Johns-Manville's extensive research facilities and years of practical diatomite experience. Call him today or write Johns-Manville, Box 60, New York 16, New York. In Canada, write Port Credit, Ontario.

\*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

**Industry's most versatile MINERAL FILLER**



When inquiring check 7653 opposite last page

SEPTEMBER 1956

### FOR THE LABORATORY

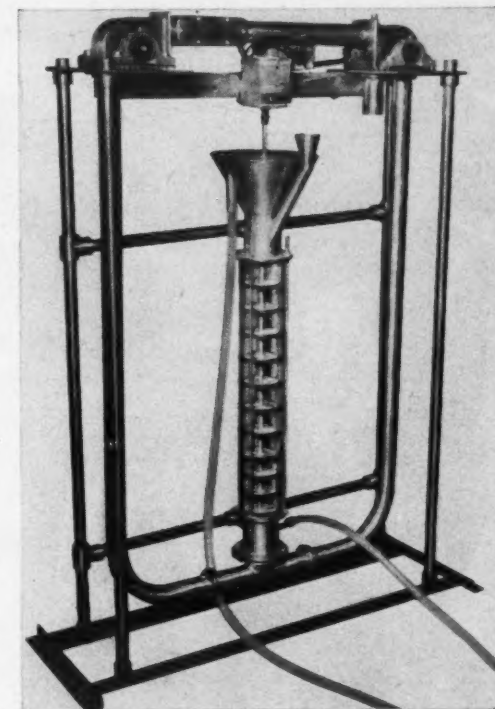
**Continuous contact column  
is used to settle solids  
counter-currently...**

distance between plates can be varied with use of ordinary glass pipe spacers

**Uses:** For water, acid and alkali ore leaching, dissolving, decolorization, ion exchange, absorption, and oil extraction.

**Features:** Continuous contact column is laboratory model of process units introduced by manufacturer in 1955.

**Description:** Continuous contact column unit has three-inch diameter column and includes solid

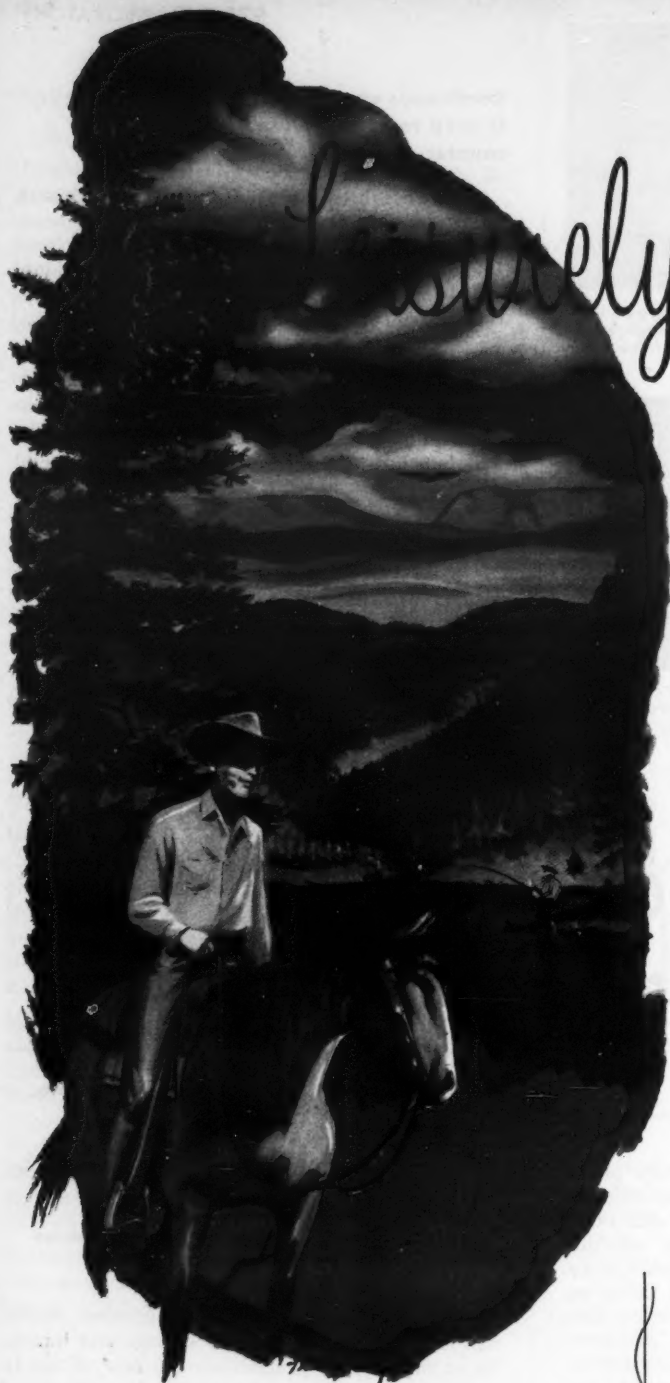


Distance between plates can be varied by ordinary glass type spacers

handling conveyor, stand and stirring motor. Solids are fed into hopper at top of column and liquids in at the bottom. Counter-current flow of solids and liquids adapts the unit for bench study of extractive, leaching, and dissolving operations. Complete unit can be used in a space 54 inches high by 34 inches wide.

(Laboratory continuous contact column is product of Allis-Chalmers Manufacturing Company, Dept. CP, 1126 South 70th Street, Milwaukee 1, Wisconsin... or for more information concerning manufacturer's product, reader may simply check 7654 on the convenient Reader Service slip which is located opposite last page.)





*Securely living...*

Los Alamos Scientific Laboratory is located in a delightful small city, high in the pine forests of northern New Mexico. It is a city of

## and Career Opportunities in Engineering

The Laboratory has immediate openings for:  
**MECHANICAL ENGINEERS**

Challenging problems in the design of weapon components, their fabrication and testing; design, control, and testing of reactors; support of programs in nuclear physics research including an intriguing variety of work in controls, machine design, gaging.

### CHEMICAL ENGINEERS

Development and research in formulation and fabrication of new materials; design and preliminary manufacture of weapon components for systems testing; studies in fluid flow and heat transfer, particularly in systems at high temperatures and pressures, recovery and purification of radioactive materials by remote control processes.

### ELECTRICAL AND ELECTRONICS ENGINEERS

Creative development of instrumentation for recording the history of events which occur in times as short as milli-microseconds; a wide variety of instrumentation including scintillation counters, fast pulse amplifiers, fast oscilloscopes.

### CHEMISTRY AND METALLURGY

Work in these fields includes high temperature thermodynamics, properties of rare metals, development of high temperature fuels and structural materials for nuclear reactors, radiochemistry, radiation chemistry, uranium and plutonium metallurgy and chemistry, complex ion chemistry, microanalysis, isotopic analysis.

If you feel you are an above-average candidate, if you want to join the scientists at Los Alamos working at the very frontiers of their field, write:

*Director of Scientific Personnel  
Division 1202*

**los alamos**  
scientific laboratory

OF THE UNIVERSITY OF CALIFORNIA

LOS ALAMOS, NEW MEXICO

Los Alamos Scientific Laboratory is operated by the University of California for the U. S. Atomic Energy Commission.



## LABORATORY

**Molecular weight range of 200-700  
is target for rotary condenser  
high-vacuum still . . .**

has capacity of two liters and vacuum range to 0.1 micron of mercury

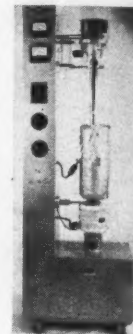
**Uses:** Laboratory still is designed for high-vacuum distillation of mixtures in molecular weight range from 200 to 700.

**Features:** Use of an all-glass column with air-cooled rotary condenser and built-in dry ice trap permit high separating efficiency.

**Description:** Internal condenser of this still serves to condense and throw distillate back to warm evaporating surface by centrifugal force. This causes re-evaporation under controlled conditions. Liquid is condensed and evaporated several times — leading to separation of heavy molecules at the bottom and lighter molecules rising to upper air-cooled condenser.

Capacity of the still is two liters and vacuum range goes down to 0.1 micron Hg. Bottom drain eases charging and cleaning operations. Complete still stands 82 inches high, has a shipping weight of 745 lb.

(Model PR rotating-condenser still is a product of Arthur F. Smith Company, Dept. CP, Rochester 3, N. Y. . . or for more information check 7655 on the convenient Reader Service slip which is located opposite last page.)



"We have emergency showers for that sort of accident, Smith!"

**Lowers X-ray spectrum range  
to include all elements  
to magnesium . . .**

has high counting rate exceeding 60,000 counts per second for soft radiation

**Uses:** With manufacturer's X-ray spectrograph and helium attachment to lower spectrographic range sufficiently to detect and measure down to element magnesium.

**Features:** Flow proportional counter has high counting rate exceeding 60,000 counts per second for soft radiation.

**Description:** Flow proportional counter uses special harmless gas manufactured by commercial gas manufacturers according to manufacturer's specifications. When X-ray beam is surrounded



Flow proportional counter together with gas cylinder and control units

by a helium atmosphere, one side of counter window is in contact with special gas and other side is in contact with helium. Gases are maintained at approximately equal pressure. Specially designed holder permits windows of different thicknesses to be mounted. Gas flow control kit consists of tank gage (0-3000 psi), exhaust gage (0-100 psi), regulator valve, shut-off valve, pressure regulator, pressure gage (0-30 psi), and flow gage (0-2 psi).

(Flow proportional counter is product of Research & Control Instruments Div, North American Philips Company, Inc., Dept. CP, 750 S. Fulton Avenue, Mount Vernon, N.Y. . . . or for more information check 7656 opposite last page.)

# Perfect answer for processing materials that must be kept from air . . .

## DE LAVAL HERMETIC CLARIFIER

Dewey & Almy Chemical Company, Cambridge, Massachusetts, solved the problem of removing undesirable agglomerates from latex without aeration with a De Laval Hermetic Clarifier. The unit has met Dewey & Almy's strict clarification specifications, as determined by conventional visual slide tests.

The De Laval Hermetic effectively clarifies viscous materials . . . doesn't emulsify or aerate because there is no contact with air . . . provides many exclusive advantages.

Find out how a De Laval Hermetic Centrifuge can give you maximum economy and product improvement. **Write for details . . . today!**



THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

When inquiring check 7657 opposite last page

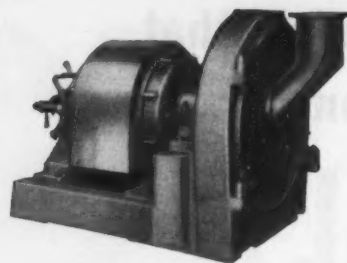


## DO YOU KNOW?

**BAUER**  
Single Disc Attrition  
Mills are Used for

- GRANULATING
- FLUFFING
- BLENDING
- TEXTURIZING
- MIXING
- FIBERIZING
- GRINDING

If you have a processing problem, we invite you to take advantage of our Research Laboratory. We maintain full-sized machines for evaluating operational data and helping our customers develop new processes.



Available in 7 sizes,  
8" to 44" diameter.  
Ask for Bulletins S-2, A-7, P-13.

In addition to single and double revolving disc attrition mills, we offer hammer mills, breakers, crushers, laboratory mills, cleaners, classifiers, specific gravity separators, and related machines. The full line is illustrated and described in our Catalog No. 52. A copy is yours upon request.

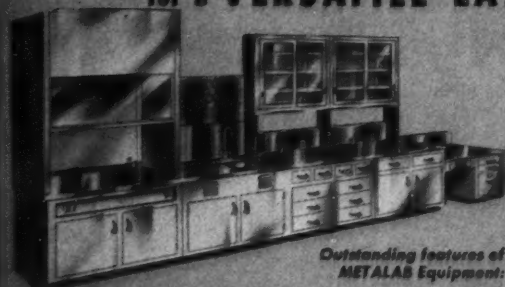


**THE BAUER BROS. CO.**  
1728 SHERIDAN AVE. • SPRINGFIELD, OHIO  
Established 1878

When inquiring check 7658 opposite last page

## METALAB

for a **VERSATILE LABORATORY**



Outstanding features of  
METALAB Equipment:

- Fireproof, waterproof, corrosion resistant, rustproof.
- Exclusive 5-point METCOTE protection throughout.
- Interlocked construction and double welded.
- Bonderized cold rolled furniture steel.

Since your laboratory is a "Testing-Ground" and a source of improved processes and products... it deserves the finest equipment. Our planning service is available without any cost or obligation.

Specify METALAB and you are assured of having equipment that is completely versatile, functional, and adaptable to future operational requirements.

The equipment shown here features entire units and illustrates METALAB precision engineered interchangeable type construction.

**METALAB Equipment Company**

230 Duffy Avenue, Hicksville, L. I., New York

- ☐ We are interested in your free planning service.  
☐ Please send us your Supplement 55-A. ☐ Please send us your 180-page Catalog 48.

Name \_\_\_\_\_ Title \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 7659 opposite last page

## LABORATORY

Unit gives high intensity  
constantly monitored  
light sources

Uses: High intensity regulated monochromatic light source for differential refractometer and light scattering photometer.

Features: Light source housing has rotatable monochromatic filter turret for four filters.

Description: Light source is high-pressure mercury vapor lamp producing strong radiations at wave lengths 365, 406, 436, 546, and 578 mμ. Filters or combination of filters are held in place in



Unit to regulate current and voltage is contained in base

turret with special snap rings. After filters are inserted, desired wave length is obtained by rotating turret to filter desired.

(Light source is product of Phoenix Precision Instrument Co., Dept. CP, 3803-05 N. Fifth St., Philadelphia 40, Pa. Check 7660 opposite last page.)

### Theory and practice of polarography

Printed in two colors, eight-page booklet explains theory of polarography and illustrates three models and accessories.

"Polarographs" is issued by E. H. Sargent & Co., Dept. CP, 4647 W. Foster Ave., Chicago 30, Ill. Specify 7661 opposite last page.

## CHEMICAL PLANTS SPECIFY: HANKISON Condensifilters for "I.Q." Compressed Air

\*the  
ONLY SINGLE UNIT  
that delivers  
"Instrument-Quality Air"

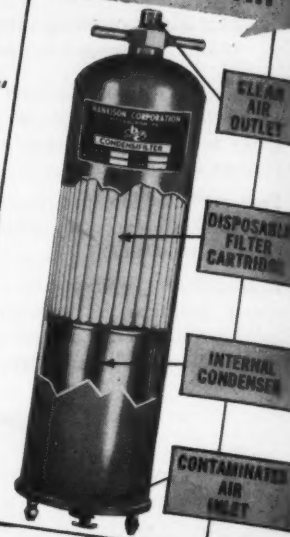
- MAXIMUM CONDENSATION  
Air is cooled to within 2° of cooling water
- DISPOSABLE FILTER CARTRIDGE  
Removes dirt, sludge, oil and other foreign matter
- RUGGED CONSTRUCTION  
For applications where certain metals are prohibited, special construction is available on request
- LOW MAINTENANCE  
Needs only 1 HOUR PER YEAR servicing
- RATED CAPACITY  
100 scfm at 100 psig

Write for  
Bulletin M-7155R



HC-5

**HANKISON CORPORATION**  
P. O. Box 8044 C, Pittsburgh 16, Pa.



When inquiring check 7662 opposite last page

## THE CAMBRIDGE INDUSTRIAL MODEL DIRECT READING

### pH METER

- Operated from any AC outlet
- Completely portable: Weighs only 10 lbs. Electrodes are integral parts of the instrument.
- Accurate to .10 pH.
- Shielded glass electrodes permit use of electrodes at any distance from the instrument.
- May be used on a bench or wall mounted.



- Self contained in one metal case including electrodes and buffer solutions.
- Extremely stable.
- Automatic temperature compensation.

Send for bulletin 910-NA.

Also available: Electron-Ray Research Model accurate to .02 pH and Laboratory Model accurate to .05 pH Single- and Multi-point recorders.

**CAMBRIDGE INSTRUMENT CO., INC.**  
3512 GRAND CENTRAL TERMINAL NEW YORK 17, N. Y.

Pioneer Manufacturers of  
**PRECISION INSTRUMENTS**

When inquiring check 7663 opposite last page

CHEMICAL PROCESSING

**Halts vaporization and splashing  
in 1000-ml blenders . . .**

three-inch copper sphere is water cooled;  
covers liquid surface in blender

**Uses:** Designed for cooling and preventing evaporation and splashing in laboratory blenders of about one liter capacity.

**Features:** Cooler maintains contents of blender at one or two degrees above temperature of circulating water.

**Description:** Two actions are responsible for performance of blender cooler — 1) it stabilizes agitated liquid at its surface, and 2) lowers temperature of the liquid to just above temperature of the cooling water supplied. Cooler consists of a hollow copper bulb three inches in diameter and having a tubular neck. Water enters inlet tube soldered to metal cap of this neck, circulates through sphere, and leaves an outlet tube at top of the neck.



Typical operation — in an ambient temperature of 32°C, cooling water at 25°C maintained

ethyl ether in a blender at 27°C.

Overall height of the cooler is 13 inches. It may be clamped on a ring stand and lowered as required. It will fit any blender container of about 1000 ml capacity. Outlet and inlet cooling leads are suitable for connection by 1/4-inch bore rubber tubing. Cooler is finished in bright nickel plate.

(Cenco-Pinto surface cooler is a product of Central Scientific Co., Dept. CP, 1700 Irving Park Road, Chicago, Ill. Check 7664 opposite last page.)



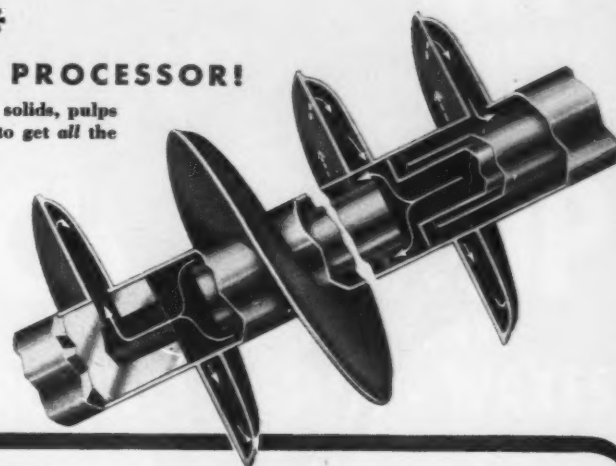
"What should I do with this leftover cobalt-60?"

if you have a Cooling... Heating... or Drying problem  
investigate the revolutionary advantages of...

**THE holo-flite<sup>\*</sup> PROCESSOR!**

If you have processes where slurries, granular solids, pulps or pastes are cooled, heated or dried, be sure to get all the facts on HOLO-FLITE advantages.

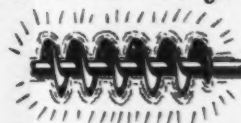
HOLO-FLITE handles such processes — in continuous flow — in as little as 1/5th the space of other types of heat exchangers. What's more, it is readily adaptable to a wide range of applications — is simple to install and maintain — and provides many other important savings.



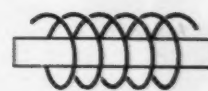
**typical HOLO-FLITE advantages...**



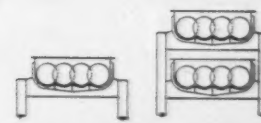
**ITS APPLICATION FLEXIBILITY** is almost unlimited. It cools, heats, or dries. It handles granular solids, pulps, pastes, slurries and fluids with equal ease. Its heat transfer agent can be water, refrigerant, hot oil, Dowtherm, steam or other liquids or vapors at any of a wide range of temperatures. It cools materials in ranges from 1800°F to 0°F. It heats and dries with hot oil to 600°F...with Dowtherm to 750°F...with steam to 150 lbs. per sq. in. pressure.



**THE LARGE HEAT-TRANSFER SURFACE** saves space — HOLO-FLITE requires as little as 1/5th the space of other heat-exchange equipment of comparable capacity. Moreover, a more complete heat transfer is effected, resulting in more uniform processing.



**ROTATION IS SLOW** — granular and powdered solids are handled with practically no dusting — negligible abrasion. There are no dust recovery problems — a further saving in installation, maintenance and operating costs!



**ITS OPERATING CAPACITY** is readily adaptable to virtually any requirements by simply varying the diameter, pitch, and length of flights, as well as the number of "tiers." Multi-tier units require no more floor space than single-tier installations!



**HOW HOLO-FLITE WORKS...**

Basically the HOLO-FLITE consists of one or more flights of hollow-bladed screw conveyors. The product to be processed moves through a trough housing the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums — as the product is continuously moved along in a bulk-flow without interruptions!

GET THE COMPLETE FACTS on Holo-Flite savings and how this field-proven unit can save space, time and money on your processing operations. This eight-page descriptive bulletin will gladly be sent on request. No obligation, of course!



\* T.M. Reg. (Hollow-Flite)

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When inquiring check 7665 opposite last page





## VISCOSITY\*

\*"That property of a body in virtue of which, when flow occurs inside it, forces arise in such a direction as to oppose the flow." — Webster

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# Brookfield

ENGINEERING LABORATORIES INCORPORATED  
STOUGHTON 14, MASSACHUSETTS

When inquiring check 7666 opposite last page

## FOR THE LABORATORY

### Inert to most chemicals yet seals vacuum

Is non-breakable and won't "freeze"; completely inert chemically except to metallic sodium

**Uses:** Can be used as laboratory gland and stopper with any materials except metallic sodium.

**Features:** Gland is vacuum tight to  $5 \times 10^{-6}$  mm Hg and operates at temperatures as high as  $200^{\circ}\text{C}$ .

**Description:** Laboratory gland is available in one size — 24/40 standard taper — and is supplied for either 6 or 10 mm shafts or tubing. Unit



Gland (inset) seals tubing, stirring rod, and thermometer on vacuum flask

has inner and outer O-ring seals as well as an inner Teflon seal ring and requires no special shafts or tubing when in use. Gland can be fitted with glass adapters for use in wider joints.

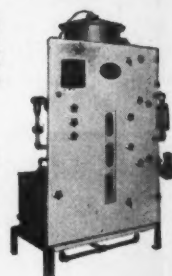
While the gland can be sealed to a high vacuum, its use as a thermometer port still allows depth regulation of the thermometer bulb. Gas entry tubes can be similarly regulated.

(ASCO gland is product of Arthur F. Smith Co., Dept. CP, Rochester 3, New York . . . or for more information reader may simply check 7667 on the convenient Reader Service slip which is located opposite last page.)

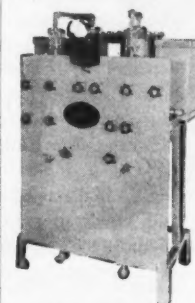


## "PACKAGED" DE-IONIZERS

Right, standardized Model MB Mixed-Bed De-ionizer available in four sizes for maximum flow rates ranging from 150 to 1000 gals. per hr.



Left, typical Model LU or HB Two-Bed De-ionizer, each series made in six sizes covering maximum flow rates ranging from 150 to 1000 gals. per hr.



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Each one of these "packaged" De-Ionizers is assembled at the factory, the resins put in the tanks, and the completed unit given a working test. Then, without dismantling in any way, it is crated, and is ready for shipment. For full details and specifications, write . . .



NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N.Y.  
CANADIAN DIST: PUMPS & SOFTENERS, LTD. LONDON, ONT.

When inquiring check 7668  
opposite last page

CHEMICAL PROCESSING



## When 3 gauge glasses can cost less than only 1

The money you spend to have a spare and a spare spare may save big money in prevented down time.

### It works like this:

Order 2 spares for every gauge glass in your plant. Use 1 for routine replacement. Keep 1 for emergency use. This extra spare you buy now costs nothing extra because you'll buy one eventually, anyhow. By stocking ahead, you protect yourself. Free insurance, really.

Remember: "ONE FOR THE GAUGE AND TWO FOR THE SHELF." And always specify hard-to-break CORNING®, PYREX® and MACBETH® gauge glasses. It's the economical way.

### CORNING INDUSTRIAL GLASSWARE FOR EVERY JOB

Application	Recommended Product
Normal Conditions (Up to 100 p.s.i.)	CORNING brand standard gauge glasses
Higher temperatures	PYREX brand high-pressure gauge glasses
Higher pressures	PYREX brand heavy-wall gauge glasses
Extra visibility	PYREX brand red-line gauge glasses
Heavy-duty service	MACBETH brand flat gauge glasses
Viewing inside furnaces, reactors, pressure vessels, etc.	PYREX brand sight glasses
Lubrication inspection	PYREX brand lubricator glasses
Visible discharge devices	PYREX brand oil cup glasses



**CORNING GLASS WORKS**  
Corning, New York

*Corning means research in Glass*

When inquiring check 7669  
opposite last page

## FOR THE LABORATORY

**Only one minute required  
to load, light, and look  
with refractometer . . .**

modified design brings prism, loading point  
in front of operator for easy reach

**Uses:** Determines refractive index in the range  
1.30 to 1.71 for quality control.

**Features:** Operator can load refractometer,  
light sample and take a reading in about one  
minute.

**Description:** Designed for measurement of re-  
fractive index of liquids, dissolved solids, and some  
opaque solids, instrument is calibrated in refractive  
index and also 0 to 85% solids. It is designed to  
be operated by non-technical workers. Refrac-



Range of refractometer is 1.30 to 1.71 refractive in-  
dex, 0 to 85% solids

tometer loads from the front within easy reach of  
operator. Loading prism assembly is in a horizontal  
position to reduce spillage.

Sample is lighted quickly with built-on illuminator  
which swings into position. Lamps (flashlight  
type) may be readily changed. Readings are taken  
through single eye piece. All calibration adjust-  
ments are made using an Allen wrench. Prisms can  
be changed by the user.

(Abbe 3-L Refractometer is a development of  
Bausch & Lomb Optical Co., Dept. CP, 635 St.  
Paul St., Rochester, N. Y. . . . or check 7670 on  
form opposite last page.)

For more information on product advertised  
at right, specify 7671 . . . see information  
request blank opposite last page.



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smaller models - Stainless Steel Available - FULL  
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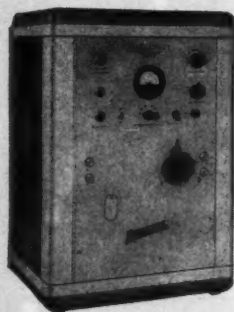
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### BURRELL CORPORATION

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When inquiring check 7673 opposite last page

## LABORATORY

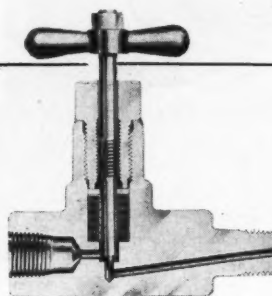
### Cuts interference in flame analysis for calcium

Uses: In making flame photometer determinations of calcium.

Features: Filter combines a high sensitivity to calcium with rejection of interfering light.

Description: Filter combines glass filter for rejecting sodium emission with multi-layer interference filter for rejection of potassium and lithium emission. Resulting filter transmits high percentage of emission over region from 6180 to 6400Å. Resultant sensitivity is comparable to that produced by an all glass filter. Rejection of lithium and potassium emission spectrum is improved by filter by factor of 50 over previous emission filters.

(Information was taken from a report by S. J. Sage, research physicist at Baird Associates, Inc., Cambridge, Mass. to Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy.)

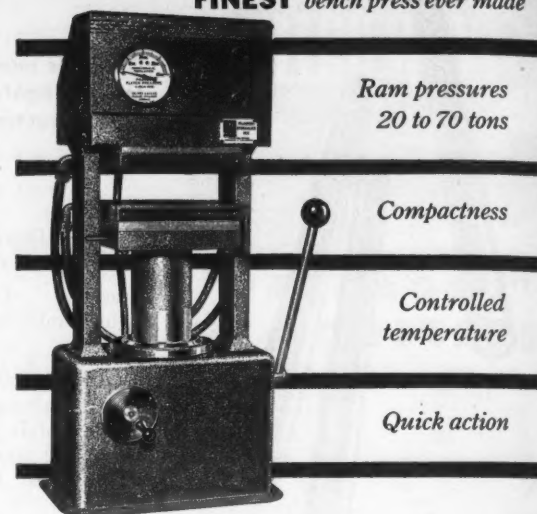


### Has alloy steel body for 30,000 psi

High-pressure needle valve for pilot plant work tests to 30,000 psi. Valve has one piece alloy steel body, welded bonnet for maximum safety, and a multi-compound, V-type packing especially developed to withstand high pressures and temperatures.

(High-pressure needle valve is product of Oil Center Tool Company, Dept. CP, P. O. Box 3091, Houston, Texas... or check 7674.)

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Ram pressures  
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We build presses for every purpose in the fields of rubber and plastic moulding, laboratory testing and graphic arts. Write for circular or if you prefer we'll have our nearest representative call on you...

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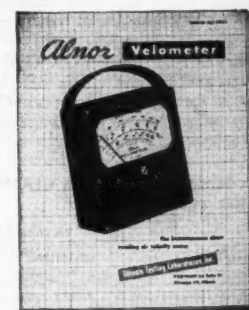
Pasadena Hydraulics, Inc., 277 No. Hill Ave., Pasadena, Calif.

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Tear out this ad and mail it with your business letterhead to Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.



**PRECISION INSTRUMENTS  
FOR EVERY INDUSTRY**

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CHEMICAL PROCESSING

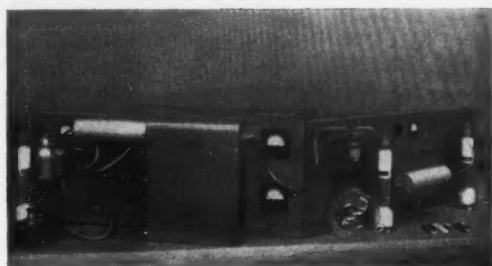
**Uses high-frequency furnace  
for complete ignition  
of sample . . .**

reduces time per determination of hydrogen  
to five minutes

**Uses:** As gas analyzer for hydrogen and carbon  
in zirconium, titanium, heat resisting metal alloys,  
hydrides.

**Features:** Hydrogen and carbon analyzer can  
reduce time per determination of hydrogen in  
zirconium and titanium to five minutes. Accuracy  
is comparable with vacuum fusion.

**Description:** Analyzer consists of purification  
train, combustion apparatus, and collection train.



Analyzes for hydrogen and carbon in titanium

Sample is completely ignited to the oxide with  
hydrogen and carbon released as water and carbon  
dioxide. Absorption bottles collect them individ-  
ually for weighing. Induction furnace uses tem-  
peratures well in excess of 3000°F to eliminate  
material and sample form restrictions. Samples up  
to 10 g can be handled. Analytical range for hydro-  
gen is from 3 ppm to 5.00%, for carbon from 50  
ppm to 0.300%.

(Gas analyzer is product of National Spectro-  
graphic Laboratories, Inc., Dept. CP, 6300 Euclid  
Ave., Cleveland 3, Ohio . . . or for more infor-  
mation check 7677 on form which is located oppo-  
site last page.)

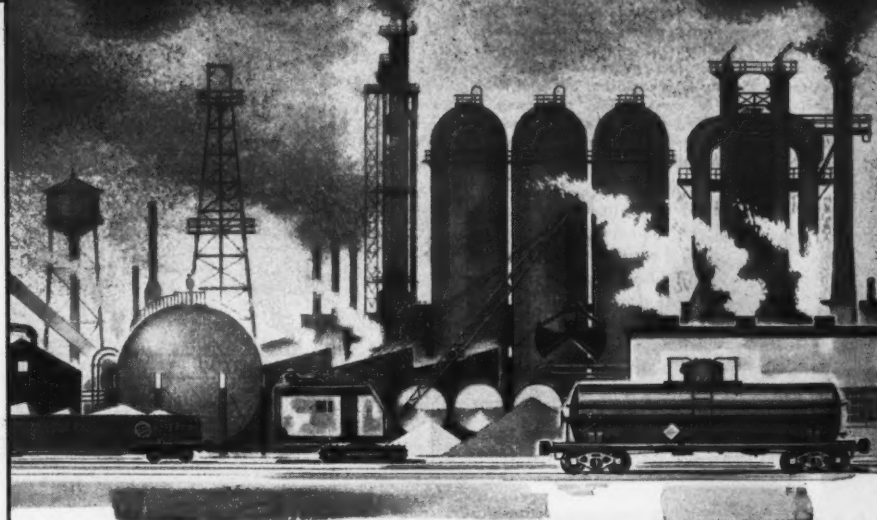
**Contains weight classifications  
and tolerances**

Including recently revised government weight  
classifications and tolerances, 24-page booklet  
illustrates laboratory balances and weights. Bal-  
ances shown include: analytical, general labora-  
tory, triple beam, heavy duty, industrial, torsion,  
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Bul 15D is issued by Central Scientific Company,  
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nois. When inquiring reader may simply check  
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Lubricant  
Match  
Metallurgical  
Metal Working  
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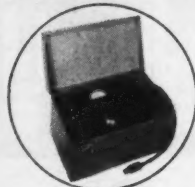
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Quick, Convenient, Accurate. Now you can measure progress of corrosion at any location in your system or plant without need for handling test coupons, taking samples or disturbing plant operations! The CORROSOMETER system consists of any number of probes, which remain in continuous service and a meter which plugs into each probe to indicate extent of corrosion directly in micro-inches of metal lost. Probes are available to meet various processing requirements in Chemical Processing—Buried and Submerged Structures—Laboratory Testing—Petroleum Production and Refining—Food Plants, and other Industrial Applications.

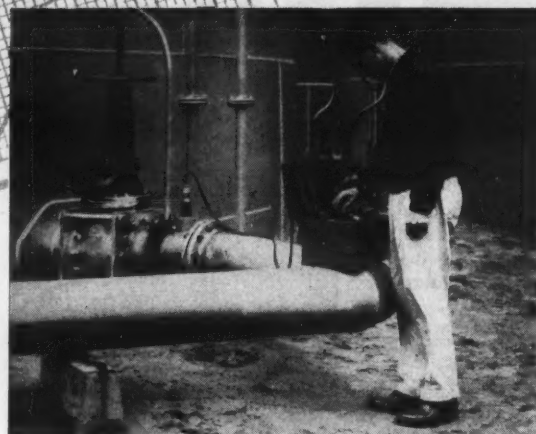


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**in your unit operations  
apply GRINDING MILLS,  
CRUSHERS correctly**

*Write for Bulletin*

This bulletin with its explanation of the "work index" formula enables an operator to evaluate any size reduction . . . compare efficiency of plants, circuits and machines. Write for this handy tool. It offers the only practical approach to improving efficiency . . . of determining the right machine for a job.

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MANOMETERS**

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Illustrated Bulletin C

**Trimount**  
INSTRUMENT CO.  
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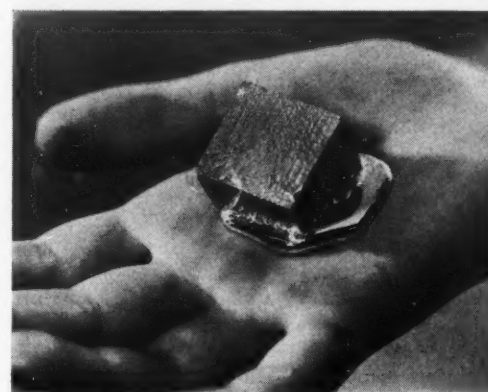
## FOR THE LABORATORY

**High-vacuum joint still tight  
after ten days . . .**

gallium as sealant holds five micron vacuum; can be effectively used on *unground* glass joints

**Uses:** As a sealant for conventional ground glass joints in laboratory glassware. Gallium metal can also be used for sealing *unground* glass joints effectively.

**Features:** Under test conditions that cause leaks in four days with best available conventional sealers, gallium metal was still tight after ten days when test was discontinued. Conditions were a five micron vacuum with liquid nitrogen to tem-



Melting point (30°C) of gallium and its low specific heat permit it to melt easily at body temperature

peratures of +90°F. One-tenth of a gram of gallium was used to seal a 1 x 2.5 cm tapered ground glass joint.

**Description:** Most conventional sealants for ground glass joint suffer two drawbacks — high vacuum evaporates sealant material and sealants may dissolve when contacted by solvents. Gallium metal appears to offer a decided improvement.

In the test mentioned above, a glass joint was carefully cleaned and dried. Liquid gallium was inserted into sleeve of the joint and tapered section was twisted into place. Liquid metal coated entire joint surface and some liquid was expressed in twisting the joint tight. On cooling, gallium solidified to form a tight seal. To uncouple the joint it was heated with a warm cloth — though holding it in hand for a few moments supplies enough heat to melt the gallium.

Gallium oxidizes and hydrates slowly. It is inert to most acids and can be dissolved with difficulty in hot caustic. Hot caustic is used in clean joint after taking it apart. There is indication that smooth, unground glass joints would perform better with the gallium sealant than ground glass joints do.

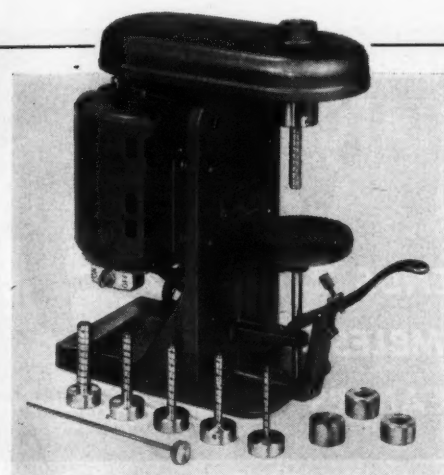
Gallium has a melting point of just under 30°C

and does not boil until somewhere above 1600°C. Specific gravity of both the solid and liquid is about six — the liquid being denser. Expansion on solidification amounts to 3.2 percent. Vapor pressure at normal temperatures is negligible and amounts to less than 0.004 mm Hg at 900°C. Specific heat is low (0.09 and 0.098 calories per gram per °C for the solid and liquid, respectively). (Gallium is produced by Chemicals Division, Aluminum Company of America, Pittsburgh 19, Pa. . . . or for more information check 7683 on form opposite last page.)

#### Details polyethylene pump for laboratories

Brochure of six pages describes polyethylene laboratory hand pump which is unaffected by strong acids, alkalis, and most solvents. Other polyethylene laboratory ware illustrated in booklet includes carboys, bottles, syphons, jars, trays, pipet rinsers.

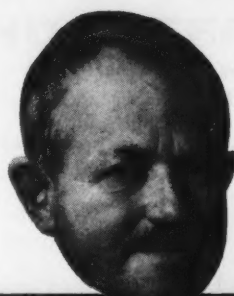
Supplement 563 is issued by Bel-Art Products, 4917 Murphy Place, West New York, N. J. Specify 7684 opposite last page.



#### Bores rubber stoppers in seconds

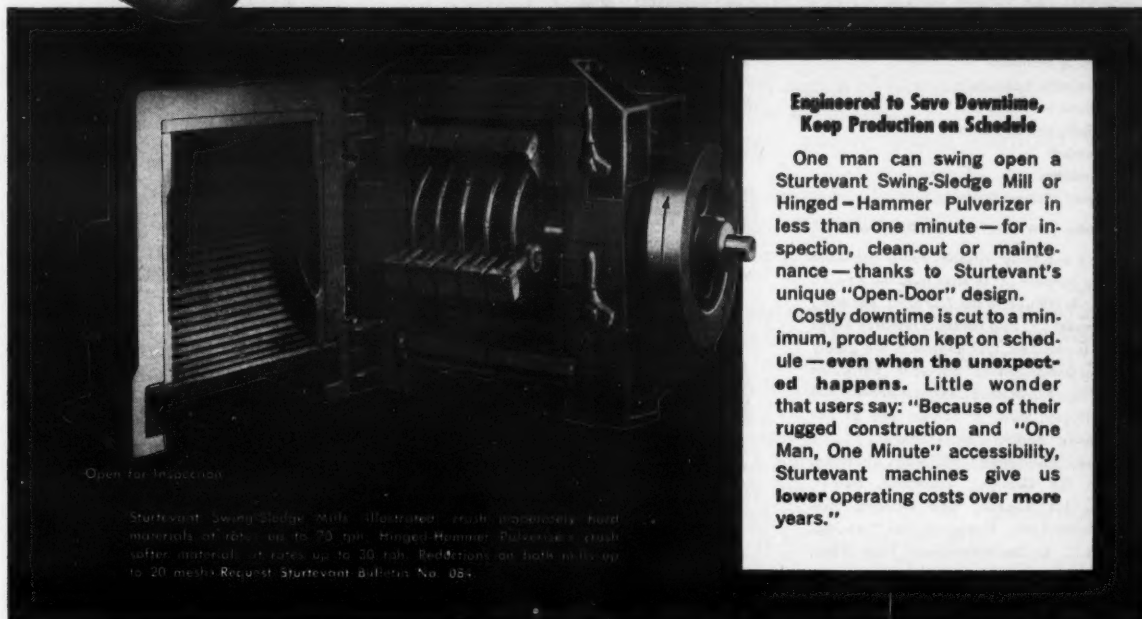
Producing accurately bored holes in stoppers and corks, borer eliminates manual work. Stopper or cork is placed on platform and then raised to cutting area. Rotating borer driven by 1/8-hp motor cuts out plug at 800 rpm. Unit includes six cutting tubes. Weight is 22 pounds.

(Power borer is product of E. H. Sargent & Company, Dept. CP, 4647 W. Foster Ave., Chicago 30, Illinois . . . or check 7685.)



## "Two Minutes Daily Solved Our Tough Grinding Problem"

Says W. Carleton Merrill, Manager, Protein Division, Jas. F. Morse Co., Boston, Mass.



#### Engineered to Save Downtime, Keep Production on Schedule

One man can swing open a Sturtevant Swing-Sledge Mill or Hinged-Hammer Pulverizer in less than one minute—for inspection, clean-out or maintenance—thanks to Sturtevant's unique "Open-Door" design.

Costly downtime is cut to a minimum, production kept on schedule—even when the unexpected happens. Little wonder that users say: "Because of their rugged construction and "One Man, One Minute" accessibility, Sturtevant machines give us lower operating costs over more years."

### STURTEVANT "OPEN-DOOR" DESIGN MAKES MAINTENANCE A CINCH, INSURES OPERATING EFFICIENCY

"We wanted 100 per cent discharge area from our grates," Merrill of the Morse Co. reports. "But cake tankage—broken bone pieces and trimmings of meat and fat—can clog up any grate if all the grease isn't pressed out. In two minutes at the end of the day we can open our Sturtevant Swing-Sledge Mill for inspection, clean it if necessary, and button it up for the next day's production."

If you grind anything as unpredictable as cakes of dry rendered tankage—like the Morse Company does—or desire low-downtime for clean-outs and emergency maintenance, you'll want the "One Man, One Minute" accessibility plus rugged construction that has been engineered into Sturtevant crushing and grinding machinery.

Write today describing your problem. Please include information on materials, process and desired capacity.

Address: Sturtevant Mill Co.,  
119 Clayton Street, Boston 22, Mass.

## STURTEVANT Dry Processing Equipment

The "OPEN-DOOR" to lower operating costs over more years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS  
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

#### JAW CRUSHERS



Reduce coarse (5 in. largest model) to fine (1/4 in.) smallest model. Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smaller sizes operate on double cam principle—crush twice per energy unit. Request Bulletin No. 062.

#### CRUSHING ROLLS



Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 36 x 20 in.; rates to 87 tph. Three types—Balanced Rolls have automatic adjustment in operation; Recommended for 3 to 1 reduction. Request Bulletin No. 065.

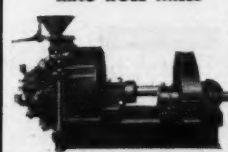
ALL STURTEVANT MACHINES ARE DESIGNED TO OPERATE ADVANTAGEOUSLY IN "UNITS"

#### ROTARY FINE CRUSHERS



Five models reduce 3 to 8 in. soft to moderately hard materials down to 1/4 to 1/16 in. sizes. Capacities up to 30 tph. No clogging; even product flow. Smallest model has 6 x 18 in. hopper opening, largest has 10 x 30 in. Write for Bulletin No. 063.

#### RING ROLL MILLS



Reduce hard or soft 1 1/2 in. and smaller sized material to from 6 to 200 mesh. Grind only—no screens. Capacities of 3 models range up to 18 tph, depending on model, material. Ring diameters and faces 24 x 7 in.; 45 x 8 in.; 44 x 14 in. Request Bulletin No. 079.

When inquiring check 7686 opposite last page





## JUDGE FOR YOURSELF...

The Merits of **Kinney**® Compound High Vacuum Pumps . . . the Most Extensive Line in the World!!

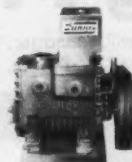
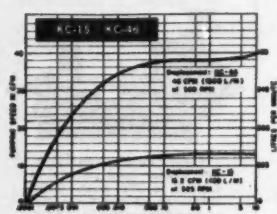
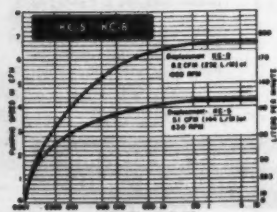
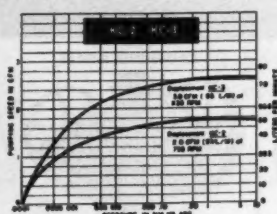
CHECK THESE SPECIFICATION DATA AND PUMPING SPEED CURVES:

### REVIEW THESE DESIGN FEATURES:

- Reliable High Vacuum (Cam and piston displacement)
- Rapid Recovery of Vacuum
- Simple to Maintain
- Dynamically Balanced
- Standard Small Motors
- Gas Ballasted (optional)
- Economical
- Dependable
- Compact, Proven Design

### Evaluate the Facts and Act Today!

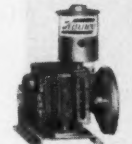
There's a Kinney Vacuum Pump available for every purpose . . . in sizes from the 2 cu. ft. per min., 1/4 HP unit to the 780 cu. ft. per min., 40 HP model . . . and constant research keeps adding to this line. Our engineers will gladly send recommendations on your particular vacuum equipment needs. Request Bulletin 403 for additional data or contact one of our competently staffed district offices . . . in Baltimore, Charleston, W. Va., Charlotte, Chicago (La Grange), Cleveland, Detroit, Houston, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis . . . or The International Sales Office, 90 West St., New York 6, N. Y.



MODEL KC-46



MODEL KC-15



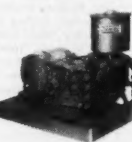
MODEL KC-8



MODEL KC-5



MODEL KC-3



MODEL KC-2

SPECIFICATIONS	MODEL KC-2	MODEL KC-3	MODEL KC-5	MODEL KC-8	MODEL KC-15	MODEL KC-46
Free Air Displacement . . .	2.0 CFM	3.0 CFM	5.1 CFM	8.3 CFM	15.3 CFM	46.0 CFM
RPM . . .	755	1135	630	1000	525	500
Motor H.P. . .	1/8	1/8	1/8	1/4	1	3
Motor RPM (syn.) . . .	1800	1800	1800	1800	1800	1800
Oil Capacity . . .	6 oz.	6 oz.	1 1/2 pt.	1 1/2 pt.	2 qt.	1 gal.
Net Weight, Complete . . .	70 lb.	78 lb.	140 lb.	148 lb.	300 lb.	585 lb.

## KINNEY MFG. DIVISION THE NEW YORK AIR BRAKE COMPANY

3573 WASHINGTON STREET • BOSTON 30 • MASS.  
INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

- Please send Bulletin 403 giving additional data on Kinney Compound Pumps

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

## LABORATORY

### Automatic pipet rinser is polyethylene . . .

most rinse water is removed before refilling cycle begins



Uses: For washing and rinsing pipets.

Features: Automatic pipet rinser is polyethylene.

Description: Pipet rinser will empty in 20 seconds, depending on rate of inflow. Rinser has special recess built into body so that rinse water is almost

completely removed before refilling cycle begins. Rinser is available in three sizes. One size will handle burets and pipets up to 33 inches long. Polyethylene baskets and jars to match are also available.

(Model B pipet rinser is product of The Nalge Co., Inc., Dept. CP, 625 S. Goodman St., Rochester 20, N.Y. . . . or for more information check 7688 on form located opposite last page.)



"Why not look at the sunny side, Benzidrene? For every one that's reacted violently, think of the thousands you haven't been able to react at all!"

## Write for

### Latest Catalog and Prices

### "Metalsmiths" Stainless Steel and Monel Utensils

Prompt shipment  
—anywhere!

Order your next requirements in corrosion-resistant utensils from the quality "Metalsmiths" line. Latest catalog shows all stock items, sizes, prices. Order direct and compare "Metalsmiths" workmanship, quality materials, long, durable service. Over 30 years serving the trade.



### WRITE FOR LATEST CATALOG — PRICE LIST



## METALSMITHS

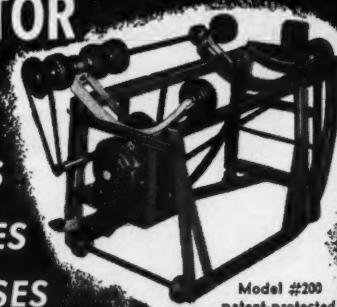
556 White St., Orange, N. J.

Specialists in Corrosion-Resisting Equipment

When inquiring check 7689 opposite last page

## inexpensive MORSE portable ROTATOR

- MIXES
- BLENDS
- TUMBLES
- CLEANSSES



Model #200  
patent-protected

In 30 to 55 gal. drums, 1 to 5 gal. cans at rotating speeds 10 to 40 rpm. The four drive-wheels have Neoprene treads, resistant to paint and oil. The idler wheels have Torrington Needle Bearings for smoother operation. Easily loaded—frame has retractable casters. Various speeds are secured through chain sprocket reduction. Morse Model #200 Rotator weighs 115 lb. Write for Bulletin 348 and free folder showing complete Morse line of Drum and Barrel Handling Equipment.

## MORSE MANUFACTURING CO. INC

737 West Manlius St., East Syracuse, N. Y.

When inquiring check 7690 opposite last page

CHEMICAL PROCESSING

When inquiring check 7687 opposite last page

**Detects presence of dust  
and measures amount  
in seconds . . .**

dust is deposited in a narrow strip on plastic sheet and is "density-read" by photoelectric eye

**Uses:** Controlling purity of air in highly-critical manufacturing operations where dust particles will impair product quality.

**Features:** Supersonic dust detector will detect and measure extent of dust conditions within seconds.

**Description:** Dust recorder sucks in air through a narrow tube and blows it at supersonic speed against a thin, plastic sheet. Dust in air is deposited in a narrow strip on the plastic sheet. Then a pho-



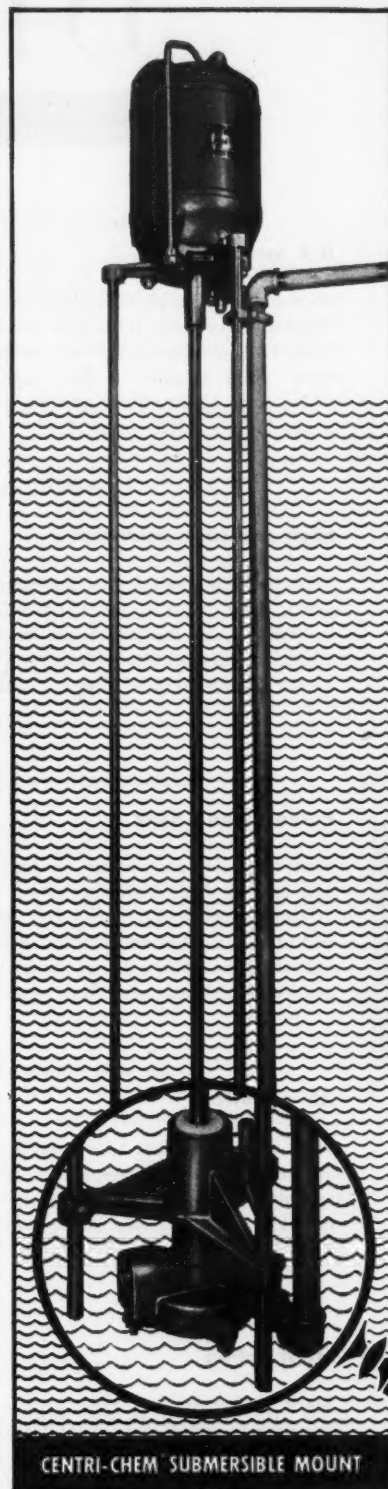
Charles A. Morrison, head of research section that developed dust recorder, shows instrument to Sherman E. Gibson, quality engineer

toelectric cell reads dust track for a measurement of dust density. Record is traced on graph paper for permanence. Instrument also has a microscope to allow fast examination of dust trail by eye. Preliminary judgment can be made, for example, whether dust is lint or metallic in origin. Complete analysis can be made of the dust by regular laboratory methods over a period of several hours.

Sensitivity of dust detector is sufficient to detect presence of a few thousandths of an inch of dust on head of a pencil dispersed through a room 8 x 10 x 15'.

(Dust detector is a development of Eastman Kodak Company, Dept. CP, Kodak Park, Rochester, N.Y. . . . or for more information check 7691 on form opposite last page.)

**ECO CHEMICAL PUMPS AVAILABLE IN PORTABLE SUBMERSIBLE MOUNT  
NO EXTERNAL LUBRICATION NEEDED WITH  
NEW ALL-TEFLON BEARING**



CENTRI-CHEM SUBMERSIBLE MOUNT

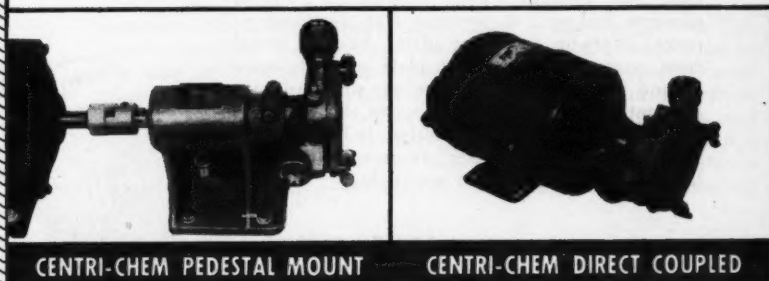
Here is a low-cost, quality submersible pump fabricated entirely of Carpenter 20 stainless steel to handle the most severe chemical service. ECO's advanced-design "COLLETON"—an all-Teflon thrust and guide bearing—eliminates the need for external lubrication. The fluid pumped acts as the lubricant, since the Teflon bearing is in rotational contact with a Teflon sleeve on the pump shaft. For the process industries, this means:

- The pumps, not limited by choice of bearing materials or lubricants, can handle dissimilar chemicals.
- Pumps can be chemically and/or steam sterilized without bearing dis-assembly.
- No bearing failure due to improper lubrication.
- No product contamination with lubricants.
- No problems with packing or mechanical seals.

Capacities to 40 gpm and heads to 50 ft, the pump can be furnished in any height up to 60 inches from the base line. Light in weight but ruggedly constructed, the entire unit is portable and can be readily moved by lift truck for discharging vats or tanks at different locations.

If you want to eliminate problems of vapor binding and priming difficulties in corrosive and hazardous applications, here is one pump that will do the entire job.

Cost is low—delivery from stock. Write or 'phone the ECO ENGINEERING SERVICE for full information.



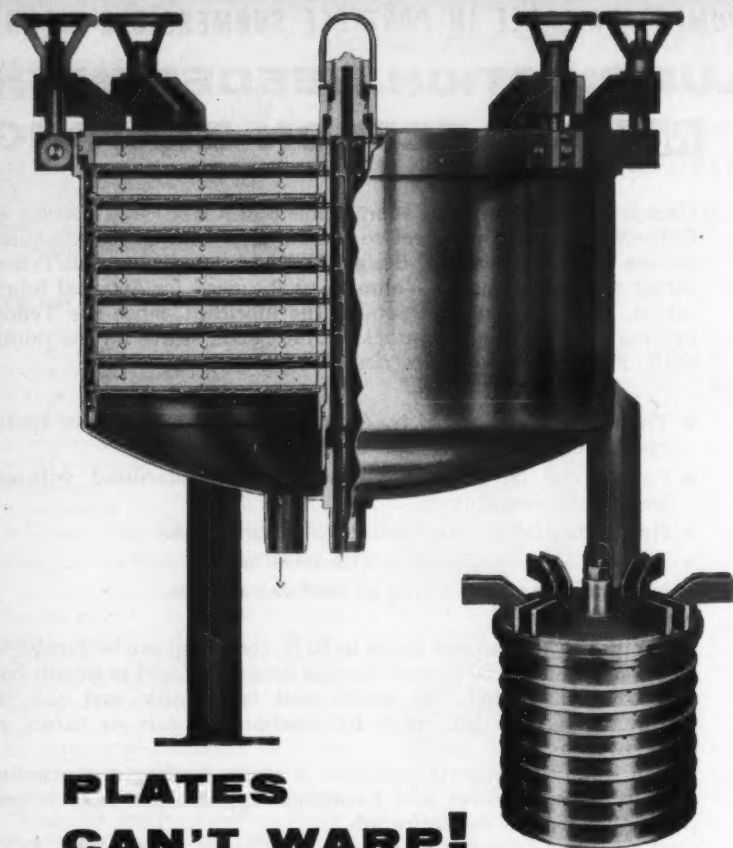
These pumps incorporate the time-tested ECO Centri-Chem pump design advantages: investment cast, statically and dynamically balanced closed or semi-open impellers; removable face plate for quick access to internal parts; provision for servicing without disturbing port connections; and Carpenter 20 stainless steel for the ultimate in corrosion resistance.

**ECO ENGINEERING COMPANY**  
12 NEW YORK AVENUE  
NEWARK 1, NEW JERSEY

*the big name in small pumps*

When inquiring check 7692 opposite last page





## PLATES CAN'T WARP!

Simple construction of the "Batch Miser" horizontal plate filter eliminates plate warping . . . and thus prevents leakage. A pressure ring (integral with cover) bears on rim of top plate. As cover is tightened, pressure is exerted on plate assembly *equally* around its perimeter. Remove one pressure nut on the central manifold and leaves can all be disassembled. Without tie rods, downtime is less. Ideal for fine filtering, "Batch Miser" recovers 100% of both liquid and solids, without scavenging.



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## Niagara FILTERS

A DIVISION OF  
**American Machine and Metals, Inc.**

Dept. CP-956, EAST MOLINE, ILLINOIS  
(Niagara Filters Europe: Amsterdam C, Holland)

- ☐ Send Bulletin with complete data on the new Niagara "Batch Miser" for handling  
☐ Send details on renting a pilot model.

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COMPANY

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CITY

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Specialists in Liquid-Solids Separation

When inquiring check 7693 opposite last page

# briefs

## H<sub>2</sub>S corrosion

High-temperature H<sub>2</sub>S corrosion tests on two Thermoform catalytic reformers are reported. Only 18-8 chrome nickel and higher alloys show good resistance. Ten pages, three tables, nine figures, three references. ("Corrosion," May 1956, page 55.)

## High-pressure oxidation

High-pressure oxidation of tungsten in oxygen at 600° to 850°C and at pressures of 20 to 500 psi was studied. Seven pages, three tables, six figures, 26 references. ("Journal of the Electrochemical Society," May 1956, page 266.)

## Polyethylene fiber

First of a two-part report on polyethylene and its uses deals with application of yarns in three-dimensional fabrics and other new end uses in plastics and textiles. Four pages, one table, two figures, 24 references. ("Modern Textiles Magazine," May 1956, p. 33.)

## Air pollution

How a steel company uses hydrogen sulfide analyzers, electronic precipitators, and smoke recorders is described. Two pages, one figure. ("Instruments and Automation," May 1956, page 908.)

## Merit rating

Merit rating systems raise caliber of advancements, spark permanent training, and provide good men for all levels in industry. Five pages, five figures, one photograph. ("Food Engineering," May 1956, page 49.)

## Harshness of fabrics

Studies of evaluation of harshness, using a single type of fabric made of wool and blends with nylon, viscose, and mohair, were made. Subjective harshness may vary directly with diameter of fiber and inversely with length of fibers that project from the surface of the cloth. Six pages, four tables, 10 references. ("Textile Research Journal," May 1956, page 355.)

## Nuclear ceramics

Ceramic materials are used around actual reactors as well as in laboratories in the nuclear industries. This article constitutes a description of development and application of some nuclear ceramics. Four pages, one table, five figures, 12 references. ("Ceramic Bulletin," May 1956, page 176.)

## Training managers

Many chemical process companies are sending executives to university-sponsored advanced management courses. This article describes supervisory training at Dow, General Electric, Monsanto, Allied Chemical, Stauffer, Du Pont, Celanese, Olin Mathieson, Rayonier, Atlas, and Interchemical. Seven pages, two tables, one figure, three photographs. ("Chemical and Engineering News," May 14, 1956, page 2356.)

## Instruments in paper mill

Electronic instrumentation in the paper industry is applied to registration of watermarks, dirt counters, micrometers, control of formation, and measurement of gloss and opacity. Four pages. ("Papermaker and British Paper Trade Journal," Midsummer 1956, page 4.)

**abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .**

#### Uranium ore

By means of ion exchange and solvent extraction, uranium-bearing ores are upgraded for Atomic Energy Commission's feed material plants. Topics discussed include shift from cation to anion, column ion exchange, resin-in-pulp, solvent extraction process, and reduction in expense. Six pages, one figure, five photographs. ("Chemical and Engineering News," June 18, 1956, page 2968.)

#### Copper sulfate in water treating

In water treatment the oxidation of manganese to insoluble oxides in a raw supply can be relieved by dosing with copper sulfate, which forms soluble manganic dioxide. Two pages, one figure, one photograph. ("Water and Sewage Works," June 1956, page 248.)

#### Superphosphate

Investigation of a process for quick curing of normal superphosphate was carried from the laboratory through the pilot plant stage. The process is satisfactory for materials suited to direct application or to mixed-fertilizer production. Five pages, two tables, six figures, six references. ("Journal of Agricultural and Food Chemistry," June 1956, page 532.)

#### Refining stahleisen

Full-scale converter experiments in blowing stahleisen with oxygen and steam are reported. Bottom-flow and surface injector converters are compared. Heat balance is improved by after-burning of waste gases. Ten pages, four tables, four figures, eight references. ("Blast Furnace and Steel Plant," May 1956, page 483.)

#### Instrument maintenance

Maintenance of recording instruments is discussed under headings of charts, standardization, and revision of instructions. Two pages. ("Paper Industry," June 1956, page 220.)

#### Quality control

From England comes a survey of the literature of quality control of laboratory and converting operations as applied to the manufacture of paper. Five pages, 62 references. ("Paper Maker and British Paper Trade Journal," June 1956, page 556.)

#### Cyanoethylated cotton

The usual textile properties of cyanoethylated cotton are not seriously affected by laundering, mercerizing, or simulated vat dyeing. Seven pages, four tables, one figure, nine references. ("Textile Research Journal," June 1956, page 423.)

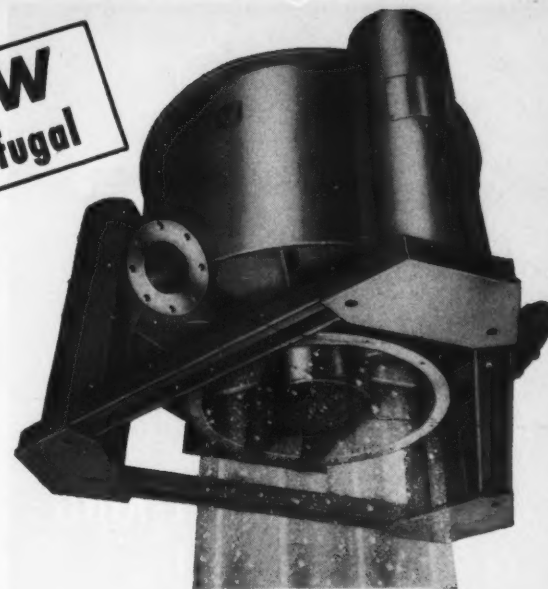
#### Finding technologists

Industry is hiring liberal arts graduates in lieu of chemists and engineers to fill certain positions where men rather than technical operations are supervised. Three pages. ("Dun's Review and Modern Industry," June 1956, page 54.)

#### Water works law

Water works law as it applies to water quality, source of supply, and distribution is illustrated with typical cases. Six pages. ("Water and Sewage Works," May 1956, page 200.)

**NEW  
Centrifugal**



## BOTTOM DISCHARGE *Plus* CENTER-SLUNG<sup>®</sup> SUSPENSION . . .

**unloads fast** This new Tolhurst Batch-Master Centrifugal discharges solids through the bottom in seconds . . . saves unloading time . . . speeds up production cycles. In fact, it's the fastest unloading centrifugal there is. The bottom opening is 25% larger than on any other machine.

**handles unbalanced loads** Batch-Master is constructed with Tolhurst's exclusive "Center-Slung" design. The points of suspension on the case are in a plane which passes through the center of gravity of the rotating basket and load. This reduces the overturning effects of unbalanced loads and allows the rotating mass to find its own center of gyration. Thus "Center-Slung" centrifugals handle 3 to 4 times greater out-of-balance loads than ordinary machines. So Batch-Master runs smoothly — with vibration largely eliminated, bearing stress relieved.

Sizes are 40" and 48" . . . in choice of corrosion-resistant materials . . . perforate or imperforate baskets. Send for full data.

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**Tolhurst CENTRIFUGALS**

A DIVISION OF  
**American Machine and Metals, Inc.**

*Specialists in liquid-solids separation.*

**DEPT. CPT-956 EAST MOLINE, ILLINOIS**

☐ Send data on new Batch-Master.  
☐ Have a representative call.

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Here's why  
**AMERICAN SHAFT-KING**  
is the pace setter  
among speed reducers

- **THEY'RE Versatile**—built for use with motors of any make, any type, any age.
- **Easily Installed**—no special shafts or shaft extensions needed. Also come with exclusive tapered hub construction.
- **Made in two ratios**—13:1 and 20:1—for speeds from 5 to 154 R.P.M. and seven sizes from ¼ to 42 H.P.
- **Equal efficiency** on either horizontal or vertical mountings.
- **Precision-Built**—Shaft-Kings are built from components made on equipment chosen solely for this purpose, using techniques unsurpassed anywhere . . . comply with A.G.M.A. standards throughout.
- **Shaft-Mounted**—no special supports or foundations needed; space is saved.
- **Proven Performance**—over 100,000 American Speed-Reduction Drives are in use in every industry, in thousands of companies, large and small, throughout the world.
- **Immediately Available**—from distributor stocks everywhere.

In other words, American Shaft-King gives you

**POWER AT THE SPEED YOU NEED**

Write today for complete catalog including selection tables.

*The American Pulley Company*  
**POWER-TRANSMISSION DIVISION**  
4222 Wissahickon Ave. • Phila. 29, Pa.

When inquiring check 7695 opposite last page

## engineering and maintenance

Six inch width of mineral wool blocks conforms well to cylindrical surface ▶

Insulating finishing cement is applied in one coat. No wire mesh reinforcement is needed ▼



**Cost of periodic maintenance at Esso Standard Oil  
is lowered by using a mineral-wool block  
insulation and single-coat finishing cement to . . .**

## minimize time needed to reinsulate cat cracker

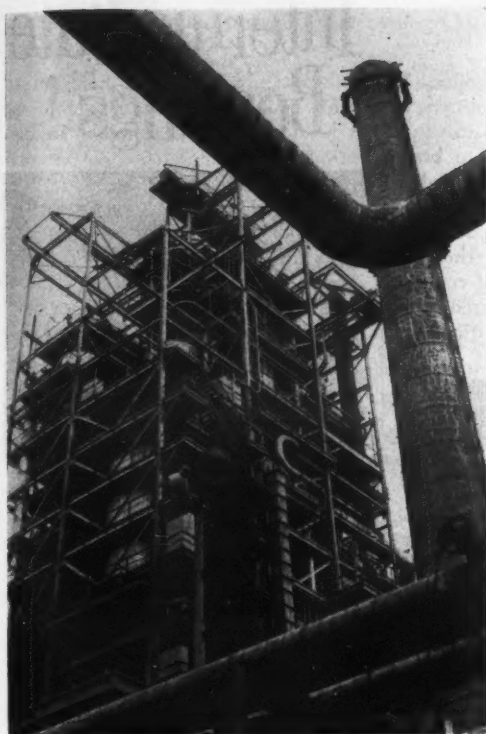
**Problem:** Maintenance turnaround time on catalytic crackers at Esso Standard Oil Co.'s Bayway Refinery, is costly but necessary to maintain efficiency of petroleum processing equipment. Time must be held to a minimum by proper choice of methods and materials employed in maintenance operations.

An important phase of maintenance work is replacement of thermal insulation removed from lines and vessels of catalytic cracker No. 1 to give access for inspection, cleaning, or repair.

Operating temperatures on insulated equipment

range from 300 to 1200°F.

**Solution:** Two insulation crews, which work continuously in conjunction with other maintenance personnel, have standardized materials and procedures for maximum efficiency. Insulation chosen consists of felted mineral wool blocks made of long, spun-mineral fibers which are easy to cut, handle, and shape. Thickness of blocks varies from one to four inches depending on surface temperature of vessel or line being insulated. All surfaces requiring more than three inch thicknesses are insulated in two layers. Since most surfaces insulated are cylindrical, minimum width



No. 1 catalytic cracking unit at Esso Standard Oil Co.'s Bayway Refinery

(6") block conforms best. Maximum length (36") provides maximum coverage with minimum number of blocks.

After block has been applied and secured by horizontal tie wires it is covered with an insulating and finishing cement. Cement is applied in one coat. No reinforcing wire-mesh is required.

Material is applied to pipes and lines lengthwise along axis of pipe and secured by circumferential girdles of 12-gage wire. Insulating-finishing cement is then applied.

**Results:** Time required to reinsulate No. 1 cat cracker is kept to a minimum. Mineral wool blocks are light, easy to handle and shape, and conform to irregular surfaces. Insulation used has good durability and insulation qualities and requires much less time in application than former material used. Finishing cement saves both time and material since only one coat is required, instead of two, and no reinforcing wire mesh is needed.

(Insulation and finishing cement are products of Baldwin-Hill Co., Dept. CP, 500 Klagg Ave., Trenton 2, N.J. . . . or for more information check 7696 on form opposite last page.)

# Cast for the role of resisting wear



## "S" Monel Sleeves



### Six advantages of Inco Castings

1. You get castings that generally outlast other materials under destructive service conditions. That's because they are made of Inco Nickel Alloys, which have been especially developed to withstand corrosion, abrasion, erosion and galling.
2. You get high quality castings because they are made to meet or exceed Government specifications for these high Nickel alloys.
3. You get castings in any practical design or size you need including centrifugal castings and standard pipe fittings. Inco has specialized in castings for over 47 years and is equipped to make your castings whether they weigh a few ounces or tons.
4. You get the benefit of Inco's help in solving your metal problems based on wide experience in field and laboratory testing of Nickel Alloy.
5. You get Inco Nickel Alloy castings made at Inco's own foundry; your assurance of sound, dependable castings.
6. Castings you once thought impractical to produce in Monel\* nickel-copper alloy, Nickel, or Inconel\* nickel-chromium alloy can often be cast by Inco's specialists.

How often have you wanted a wearing sleeve that would resist destructive conditions like abrasion and corrosion? Then take a look at these two sleeves.

The "S"\* Monel hard-grade nickel-copper cast alloy sleeve pictured at top goes on the shaft of a salt water circulating pump.

Severe abrasion and corrosion from the sandy salt water in the gland seals used to wear out shaft sleeves in these pumps every 2½ years. Usually sooner.

Then the engineers decided to try Inco-Cast "S" Monel sleeves. *These sleeves have already withstood this abrasive and corrosive attack for nearly five years!*

Pictured in the second photo is the rotor-shaft-sleeve assembly for a midget Jordan machine. This machine processes highly abrasive raw asbestos. Ordinary sleeves were lasting only 15 months.

Then centrifugally-cast "S" Monel sleeves were tried. Judging from their appearance after more than a year's service, their owners estimate these sleeves will give "ten times as much service".

Unusual service like this is common when "S" Monel alloy is used. Field records show it generally gives from three to ten times longer life than ordinary materials where service conditions involve destructive abrasion, corrosion, galling, or erosion.

Do you want to know more about this age-hardenable, corrosion-resisting casting alloy? Data on its composition, properties, and working instructions are summarized in a new bulletin, "Engineering Properties of 'S' Monel." Write for a copy today.

**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street  
New York 5, N. Y.  
\*Registered trademark



**Inco Castings** Sand, Centrifugal, Precision

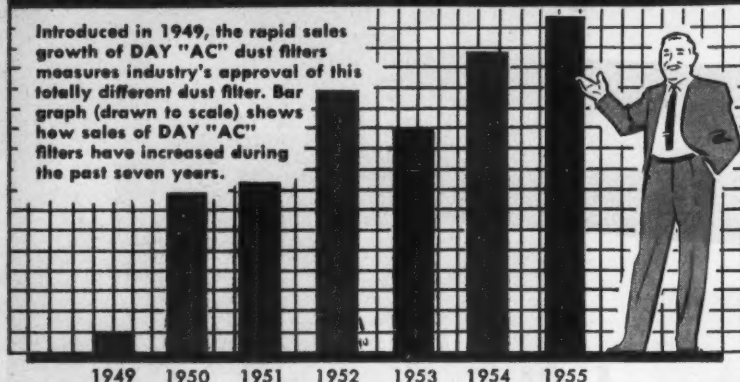
When inquiring check 7697 opposite last page



# DAY REVERSE JET DUST FILTERS

HAVE EARNED INDUSTRY'S ACCEPTANCE

Introduced in 1949, the rapid sales growth of DAY "AC" dust filters measures industry's approval of this totally different dust filter. Bar graph (drawn to scale) shows how sales of DAY "AC" filters have increased during the past seven years.



## HERE'S WHY DAY Reverse Jet Dust Filters HAVE EARNED ACCEPTANCE!

Utilizing the Hersey principle of reverse air cleaning, DAY "AC" dust filters brought industry a needed, long overdue, improved dust filter. This filter has many benefits never before found in any dust filter equipment.

● **NEW HIGH EFFICIENCY PERFORMANCE**—This filter provides efficiencies measured as high as 99.99+%. This assures cleaner air and higher product recovery.

● **NEW FILTER MEDIA**—DAY felt filter media traps more dust than woven fabric. Felt gives higher efficiency, longer life and has same pressure drop as woven fabric.

● **NEW DESIGN FEATURES**—The Hersey principle of reverse jet cleaning, DAY self-adjusting blow rings, sanitary square-to-round air inlets, automatic-continuous operation, superior filter media, are just a few of the features introduced by DAY.

● **NEW FILTER TUBE CLEANING**—Patented self-adjusting blow rings clean the entire filter tube automatically and continuously, to give DAY filters an air handling capacity 5 times higher than ordinary filters.

● **NEW LOW INSTALLATION COSTS**—Unit sub-assembly saves time and money—up to 75% on filter erection costs.

**The DAY "AC" Reverse Jet Dust Filter is the largest selling filter of its type in the world!**

Place the successful operation of your dust control system in our hands. Experienced DAY Application Engineers will survey your plant and supply you with engineered recommendations. With DAY there is no divided responsibility. Our guarantee of satisfaction is backed by 75 years of experience.

Bulletin 559 gives important facts and complete description of the DAY "AC" dust filter. Write to DAY for your copy of this informative 24-page bulletin.



Licensed by  
H. J. Hersey, Jr.



**The DAY Company**

852 Third Avenue N. E., Minneapolis 13, Minnesota  
IN CANADA: P. O. Box 70Y, Fort William, Ontario  
Branch Plants: Buffalo, Fort Worth and Toronto, Ontario  
Representatives in Principal Cities

When inquiring check 7698 opposite last page

## ENGINEERING & MAINTENANCE

**Allied Asphalt & Mineral Corporation goes to lubricated plug valves for hard-to-handle products . . .**

valve maintenance has been practically eliminated, operations made easier

**Problem:** Packings and seat rings had to be replaced every few weeks on valves used at Allied Asphalt & Mineral Corp., Dunellen, N.J. Certain valves jammed at times due to foreign materials, and often had to be dismantled to free them. Others were damaged by rapid heating and cooling from gas blow torches sometimes required to melt raw materials and products solidified in lines.



Drum-loading operation illustrates the easy, fast valve operation. Here, 4" product lines extend from bottoms of reaction kettles. Since only 30 seconds is required to fill a 55-gal drum, both operator and valve must move fast to avoid wasting product

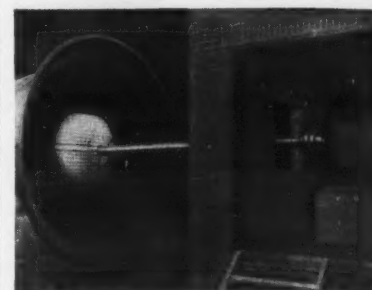
Allied Asphalt compounds special chemicals, such as plasticizers, oil extenders, saturants, finishing compounds, and waxes made to customer specifications.

Raw materials include pitches, residues from the fractionation of fatty acids, crude and refined tall oil, petroleum oils, gilsonite, and asphalts. These materials are quite difficult to handle.

**Solution:** Allied installed lubricated plug valves which employ pressurized lubricant between plug and body for a continuous seal that assures leak-proof service. Seat is never exposed to line fluid and lubrication protects against corrosive, erosive material. Pressurized lubricant jacks the plug for perfect seating and instant, quarter-turn operation.

**Results:** Use of the lubricated plug valves at Allied Asphalt has practically eliminated valve maintenance while giving fast, easy valve operation under the extremely rough operating conditions. Allied no longer has to divert personnel

## Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16' from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it, which have been giving dependable service for as long as fifteen years . . . without shutdowns for lubrication or maintenance of the couplings.

Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

**Only Thomas Flexible Couplings offer all these advantages**

**UNDER LOAD and MISALIGNMENT**

1. Freedom from Backlash—Torsional Rigidity
2. Free End Float
3. Smooth Continuous Drive with Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life . . . and

**Thomas All Metal Couplings have No Wearing Parts so Lubrication and Maintenance are Eliminated**

Write for Engineering Catalog 51A

**THOMAS FLEXIBLE COUPLING CO.**

WARREN, PENNSYLVANIA, U.S.A.

When inquiring check 7699 opposite last page

CHEMICAL PROCESSING

from production to replace packing and seat rings every few weeks. Jamming no longer occurs, since the plug shears off line debris on opening or closing the valve.

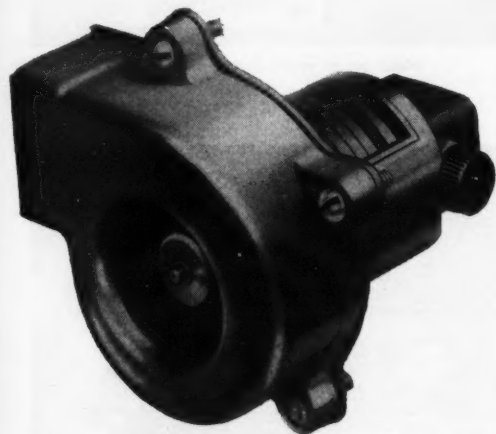
(Lubricated plug valves are a product of Rockwell Manufacturing Co., Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. . . or for more information check 7700 on form opposite last page.)

**Blower for electronic instruments  
has permanent-magnet motor,  
delivers 20 cfm . . .**

units are designed to take sudden reversals without demagnetizing

**Uses:** Blowers designed for dissipating heat generated by electronic equipment mounted in confined enclosures.

**Features:** Permanent-magnet motor, which drives blower, is designed to withstand sudden unintentional reversals. Magnets are stabilized to eliminate demagnetizing effects common to most



When unintentionally reversed, motor's magnets won't demagnetize

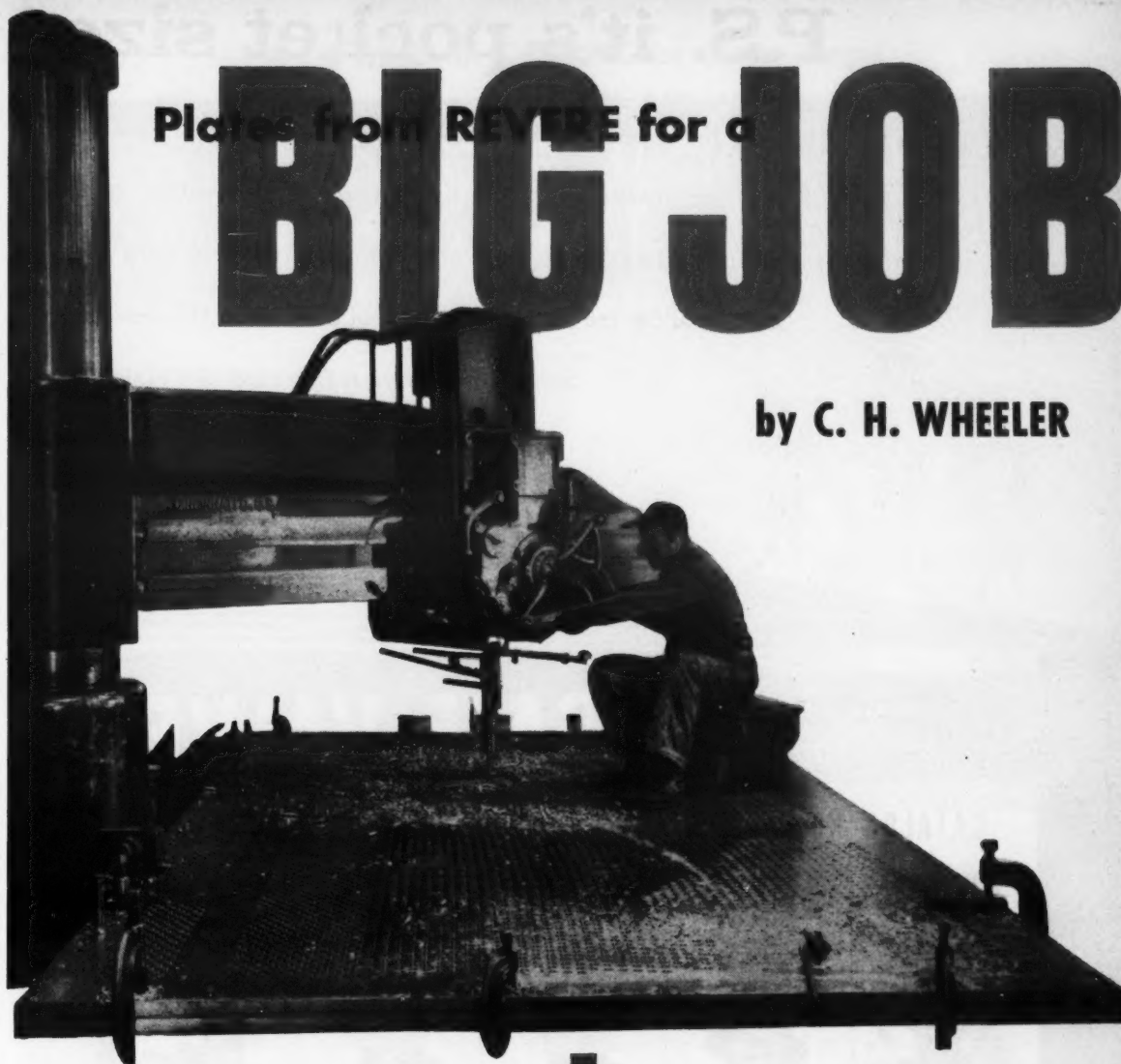
permanent-magnet motors when reversed suddenly in full speed. Elementary control circuits which short armature terminals provide dynamic braking.

**Description:** Voltages range from 6 to 115 DC. Air volume at 0 static pressure and 70°F, for a typical unit, is 20 cfm. Units are available for either clockwise or counter-clockwise rotation in several sizes. They are rated for continuous duty, and can be mounted in clamp, panel, or bracket arrangements.

(BYLM centrifugal blower is a product of Barber-Colman Company, Aircraft Controls Div., Dept. CP, 1400 Rock St., Rockford, Ill. . . or for more information check 7701 on form which is located opposite last page.)

# Plates from REVERE for a BIG JOB

by C. H. WHEELER



Here you see two rolled Muntz Metal condenser plates, being drilled simultaneously in the plant of the C. H. Wheeler Manufacturing Co., Philadelphia 32, Pa. The plates were supplied by Revere. They measure 100-3/4" x 203-3/4" x 1-1/2" thick. Four plates were supplied for a Wheeler 2-pass divided water box unit having 95,000 sq. ft. of condensing surface. The overall length of the condenser, including water boxes, is 48 ft., and overall height, including steam dome and hot well is 34 ft.

Revere is an important supplier of plates and tubes for condensers, heat exchangers, and similar equipment, shipping to all parts of the country. Collaboration on alloy selection and specification is freely available. Just get in touch with the nearest Revere Sales Office.



**REVERE COPPER AND BRASS INCORPORATED**

*Founded by Paul Revere in 1801*

230 Park Avenue, New York 17, New York  
Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton  
and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside,  
Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y.  
*Sales Offices in Principal Cities, Distributors Everywhere*

When inquiring check 7702 opposite last page



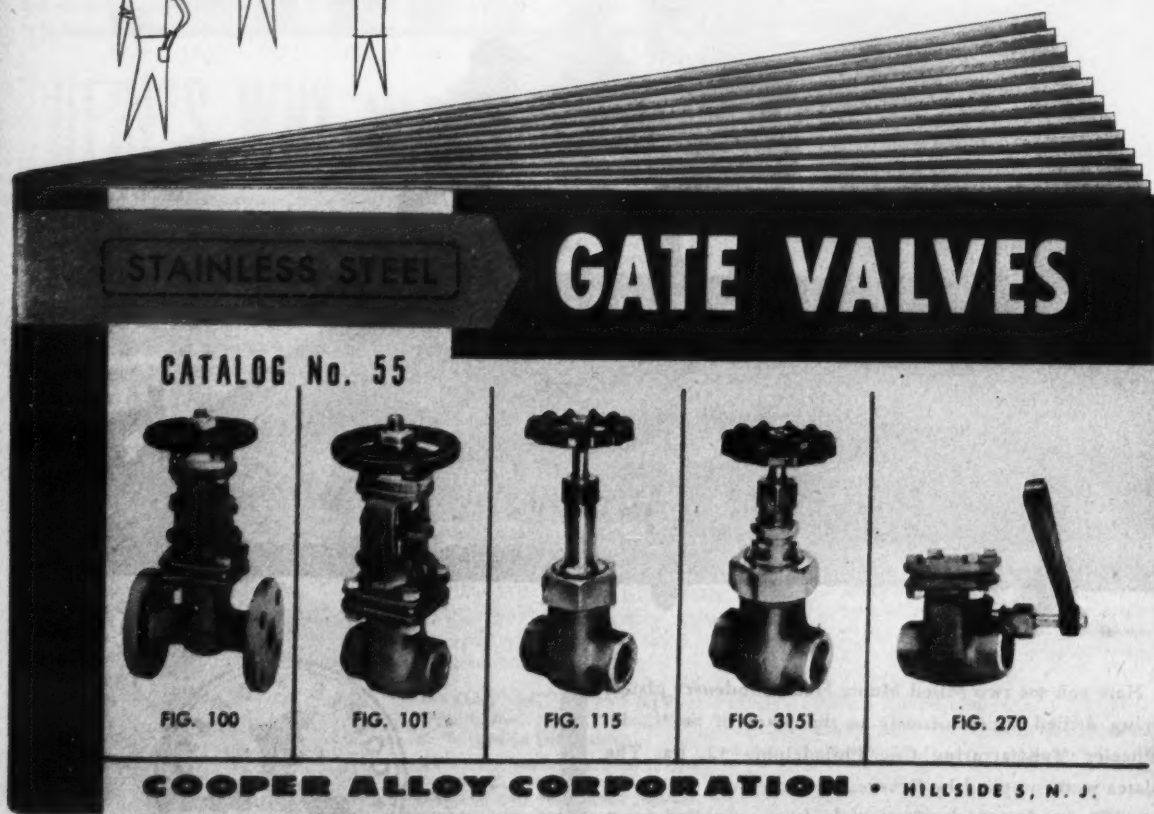
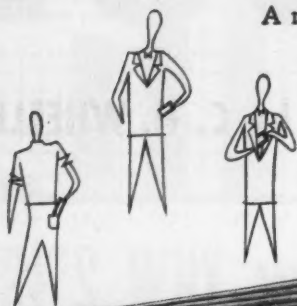
# P.S. it's pocket size !

If you've been looking for a *pocket size* catalog on *stainless steel* gate valves,

you'll find the answer in this 4" by 7" booklet. Dimensions, diagrams and basic technical data are given in a simple and straightforward manner.

A natural for the pocket . . . the tool box . . . or the desk drawer.

Send today for your free copy of Catalog 55GP.



The Cooper Alloy stainless steel valve and fitting catalog represents the most complete and easy to use guide imaginable. If you haven't had the chance to review the many forms in which it is available, check with your local Cooper Alloy distributor or representative. Or drop us a line asking for the Catalog #55 Presentation Booklet.

Valve & Fitting Division



**COOPER ALLOY**  
CORPORATION • HILLSIDE, N. J.

When inquiring check 7703 opposite last page

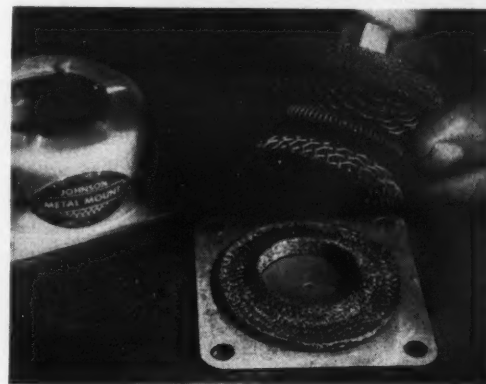
## ENGINEERING & MAINTENANCE

**Damping efficiency of 95% obtained when metal vibration mounts used for electronic instruments . . .**

beryllium-copper units withstand temperatures ranging from  $-65$  to  $200^{\circ}\text{C}$

**Uses:** Double-damping system which provides maximum vibration protection and equipment stability in mounting electronic instruments.

**Features:** Metal mounting has a damping efficiency of 95%. Magnification at resonance is



Metal mount resists rust and corrosion



Die forms beryllium-copper dish from wire mesh

controlled on the order of 1.5. Horizontal transmissibility at resonance is controlled to approximately 1.0. Unit has high strength, withstands temperature differentials ranging from  $-65^{\circ}\text{C}$  up to  $200^{\circ}\text{C}$ , and will not rust or corrode.

**Description.** Device is fabricated as follows: Beryllium-copper wire cloth is formed into a disc-like dish. Two of these discs are fastened together, back-to-back, with a brass eyelet. A circular coil spring made of stainless steel is fitted around the

CHEMICAL PROCESSING

assembly in "V" made by joining of two beryllium-copper discs. Finished mounts weigh  $3\frac{1}{2}$  oz.

(Vibration mount is supplied by K. W. Johnson & Co., Inc., Dept. CP, Dayton, Ohio . . . or for more information check 7704 on form opposite last page.)

(Beryllium-copper wire is available from Little Falls Alloy, Inc., Dept. CP, Paterson, N. J. . . . or for more information check 7705 on form opposite last page.)

(Wire cloth is a product of Cleveland Wire Cloth and Manufacturing Co., Dept. CP, Cleveland, Ohio . . . or for more information reader may simply check 7706 on the convenient Reader Service slip which is located opposite last page.)

(Beryllium-copper alloy is produced by Beryllium Corp., Dept. CP, Reading, Pa. . . . or for more information check 7707 on form which is located opposite last page.)

#### Describes prepackaged pumps

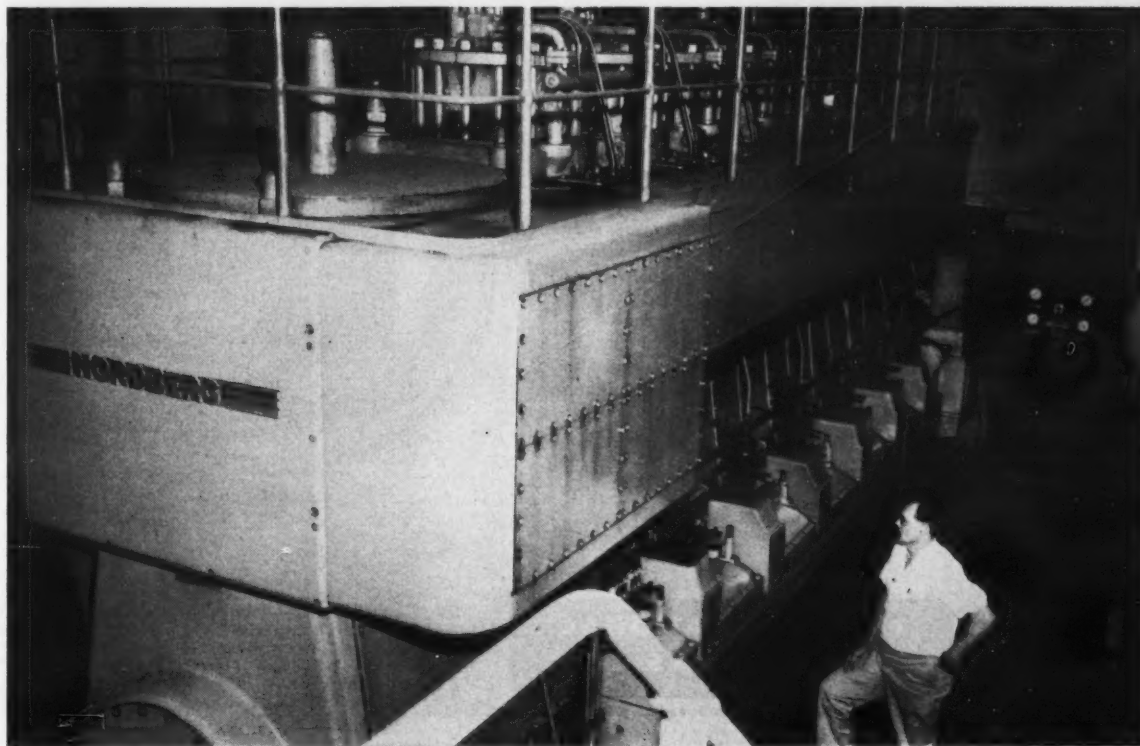
Six-page, fold-out bulletin describes company's prepackaging service for end-suction pump line. Regularly ordered sizes, ranging from 1 to 15 hp, in 22 pump models, are prepackaged in reinforced cartons for immediate shipment. Bulletin contains head-capacity performance curves for each unit and a compact selection chart.

Bul B-2319 is issued by Peerless Pump Div., Food Machinery and Chemical Corporation, Dept. CP, 301 W. Ave. 26, Los Angeles 31, Calif. Specify 7708 opposite last page.



"I know there's a fire on this floor, stupid."

Look to **COOK** for Better Rings!



## Cook rings save \$18 per day on one 2400-hp Diesel engine

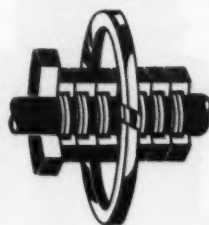
WHEN a switch was made to Cook Piston Rings, Key West Electric's No. 12 Diesel showed a saving of \$41,670, for 55,542 operating hours — an average saving of \$18 per day!

There are good, built-into-the-ring reasons why a switch to Cook almost inevitably leads to more efficient performance, more dollar savings. Cook rings are re-turned as a final manufacturing process . . . they're light-tight, conform perfectly to the cylinder wall. This prevents scuffing and

power-stealing blow-by. Also, Cook rings are tensioned by a unique, gentle "squeezing" process. Result: constant, uniform tension that *never* wears out.

Get all the facts on this \$41,670 saving.

Get complete operating data showing exactly how Cook piston rings compared dollar-for-dollar with "X" brand rings. Write for the Key West Electric Story, C. Lee Cook Company, 900 South 8th Street, Louisville 3, Kentucky.



**C. LEE  
COOK  
COMPANY**

*Rings and Packings Since 1888*

When inquiring check 7709 opposite last page



# You Get the Most for Your PROCESS HEATING DOLLAR... with International-LaMont Forced Recirculation Thermal Liquid Heaters

Trouble-free process heat to 750°F. day after day, year after year at low cost. This proven assurance is the key to the unprecedented acceptance and use of International-LaMont Thermal Liquid Heaters and Dowtherm Vaporizers.

These dependable **Forced Recirculation** Heaters are designed specifically for this high temperature service... provide accurate temperature control  $\pm 2^\circ\text{F}$ . or less, and their high velocity circulation means highest heat absorption plus freedom from fluid decomposition.

Available in standard capacities from 250,000 to 50,000,000 Btu per hour, International-LaMont Thermal Liquid Heaters and Dowtherm Vaporizers are supplied as package units complete with oil or gas burners and all controls.

Get the facts about **Forced Recirculation**, write for Bulletin TLH.



1886-1956

**THE INTERNATIONAL  
BOILER WORKS CO.**

830 Spruce St.

East Stroudsburg, Pa.

Steel Firebox Heating & Power Boilers • Low  
& High Pressure Water Tube Package Boilers  
• International-LaMont Forced Recirculation  
Generators • ASME Code Pressure Vessels  
& Welded Products.

When inquiring check 7710 opposite last page

## Raymond builds a Full Line of Pulverizing Mills ... from "Lab" Units to Super Roller Mills

Whatever your problem in powdered materials production, Raymond has a mill for it.

Built in capacities up to 30 tons or more per hour... and fineness range up to 400-mesh materials.

Equipment designed to handle your particular product  
—with drying, grinding, separating, cooling and conveying  
—all in one operation.



Tell us your requirements...  
our experience and engineering service  
are available to you.

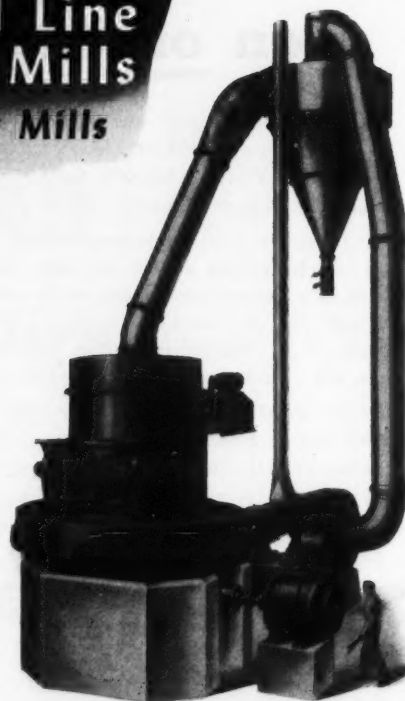
RAYMOND Laboratory Mill for  
test runs on small batches

**COMBUSTION ENGINEERING, INC.**  
*Raymond Division*

1317 North Branch St., Chicago 22, Ill.

Sales Offices in Principal Cities

Combustion Engineering-Superheater Ltd., Montreal, Canada



RAYMOND SUPER ROLLER MILL built in three  
large sizes for maximum economy in large scale  
production.

When inquiring check 7711 opposite last page

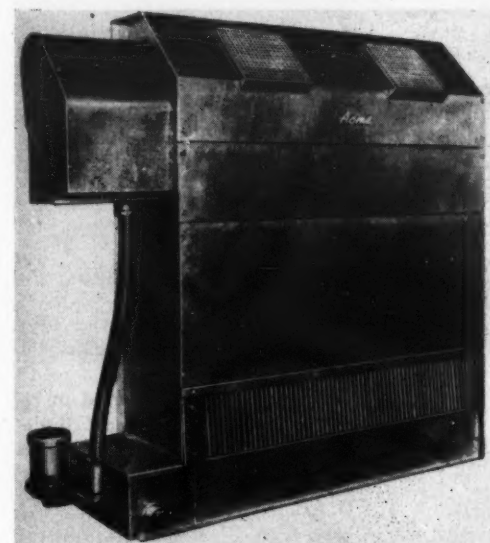
## ENGINEERING & MAINTENANCE

### Simplified servicing featured in evaporative condensers...

full access to drift eliminators, nozzles, and condenser tubes is provided

**Uses:** Provide condensing capacity in range from 20 through 150 tons at 75°F wet bulb.

**Features:** External sump simplifies water treatment, servicing of sediment screen, and draining of unit. Quick access to drift eliminators, nozzles, and condenser tubes is possible. Removable full-



Evaporative condenser's blower section has air outlets on a 45° angle for any direction of air discharge

width side panels make for easy inspection and servicing.

**Description:** Lower section has air outlets on a 45° angle that allow any direction of air discharge. Evaporative condenser has all-steel construction and finish. Units are hot-dip galvanized after fabrication. Coils are available in either copper or steel.

(Evaporative Condenser is a product of Acme Industries, Inc., Dept. CP, Jackson, Mich. . . or for more information check 7712 opposite last page.)

### Design of fan platforms to avoid vibration

Four-page bulletin tells of a number of factors to consider in designing a fan platform to avoid vibration. Alternative methods are suggested.

Bul E-9 is issued by The New York Blower Co., Dept. CP, 32nd & Shields Ave., Chicago 16, Ill. When inquiring specify 7713 on form opposite last page.

**Admixture for concrete  
gives up to 40% higher  
ultimate strength . . .**

both setting time, cement requirements cut

**Uses:** As an additive to concrete, mortar, and stucco that acts as a set-retardant and plasticizer, and is especially useful in warm weather.

**Features:** Designed to slow up the setting of these mixes, additive allows effective control of mixing, placing, and finishing. In the finished structure, it produces higher compressive strength, reduced permeability, more homogenous concrete, minimum shrinkage, and superior and denser finishes. Ultimate strengths have been increased up to 40%, setting times are shortened, and up to 15% savings in cement requirements have been made.

**Description:** Product is a dry, free-flowing, powdered composition that contains pozzuolanic (cement-like), plasticizing, and water-ratio-reducing agents designed to impart highly colloidal properties to portland cement pastes, and to delay early hydration. Water evaporation rate from mix is reduced at elevated temp, because water is colloiddally "locked in."

(Sonotard is a product of Building Products Div., L. Sonneborn, Inc., Dept. CP, 404 Fourth Ave., New York 16, N.Y. . . . or for more information check 7714 on form which is located opposite last page.)

**Valves handle unlimited pressures  
in water, steam, gas, oil,  
or similar service . . .**

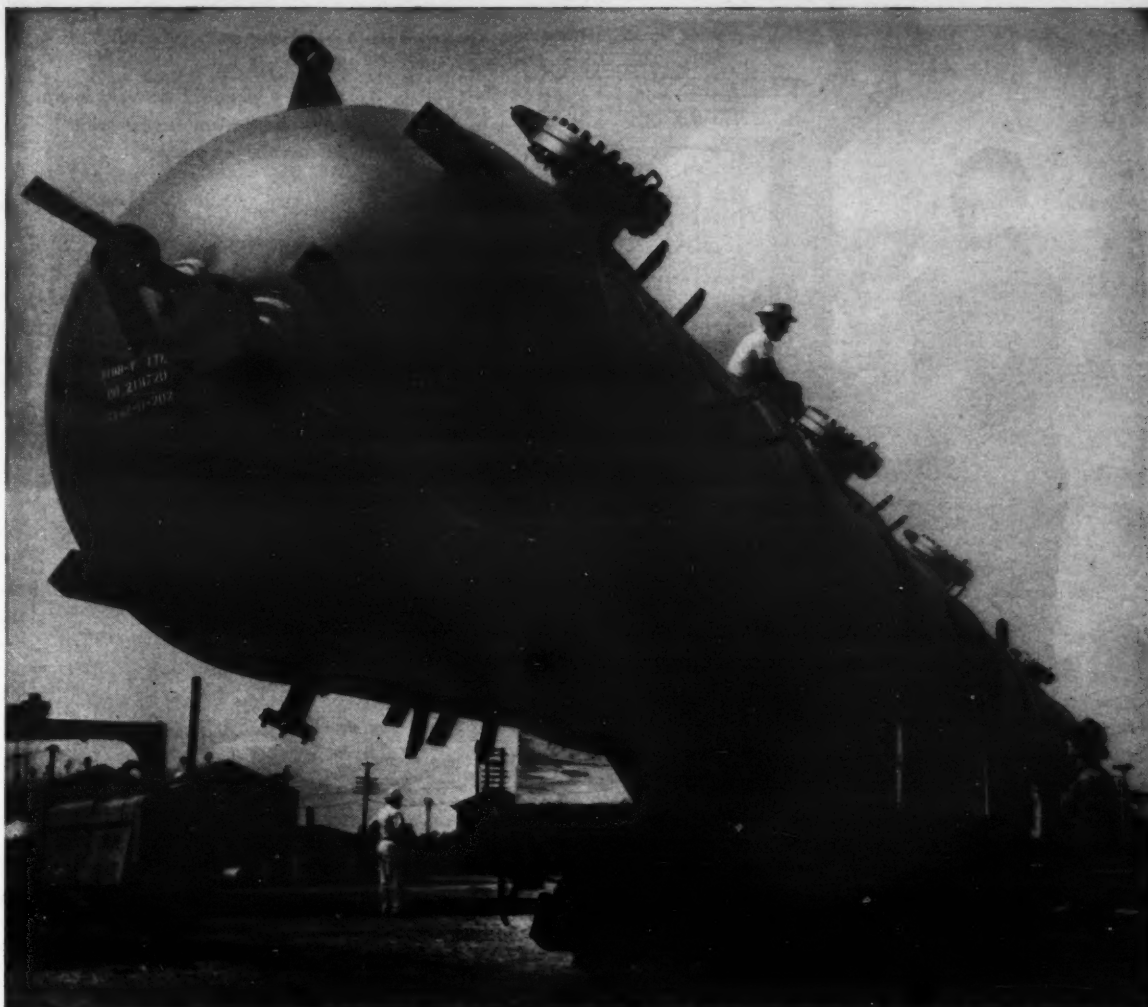
diaphragm- or piston-actuated control units have wide range of application

**Uses:** Control of flow of fluids over a wide range of service conditions.

**Features:** Diaphragm-actuated and piston-actuated control valves are designed to handle water, steam, air, gas, oil, or other similar fluids at unlimited pressures. They have a wider range of application than units formerly offered by manufacturer.

**Description:** Diaphragm-actuated unit may be direct or reverse in action. Each valve opening provides correct flow at all times. Valve bodies are made of cast iron or cast steel in either straightway or angle style. Fittings are stainless steel, single or double seat, with hardfacing when required.

(Types CV-D and CV-P control valves are products of Copes-Vulcan Div., Blaw-Knox Co., Dept. CP, Erie, Pa. . . . or for more information check 7715 on form opposite last page.)



**THIS ENTIRE VESSEL** was radiographed. Built for use by Socony Mobil Oil Company, Incorporated, it was stress relieved in thirds, and the two joints were stress relieved locally. The unit contains 30 uniflex trays of 96" diameter. Overall weight: 152,000 lbs.

## Among the largest in use ... built by Newport News

**This Debutanizer** with a 110 feet 6 inches over-all length is typical of units that are readily built by Newport News . . .

In fact, Newport News can fabricate almost any type of pressure vessel or other heavy equipment used in the petroleum, chemical or other processing industries.

But at Newport News you'll find

more than large productive capacity.

In vast fabricating shops, in huge machine shops, foundries and forging plants, Newport News craftsmen complete your order with specialized techniques. Plant methods . . . developed as a result of specializing for more than half a century . . . enable Newport News to provide money-saving answers to all sorts

of heavy equipment problems.

Newport News craftsmen handle the job exactly as you want it done . . . for maximum results per dollar invested. So let us bid on your present or future projects. Learn how Newport News can help you. Send for our illustrated booklet entitled, "Facilities and Products"...it's yours for the asking.

**Engineers**—Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

**Newport News** Shipbuilding and Dry Dock Company  
Newport News, Virginia

When inquiring check 7716 opposite last page





## AMPCO PIPE and FITTINGS resist corrosive action of fatty acid hydrolysis

*Ampco Pipe and Fittings resist corrosion, erosion, and cavitation-pitting of a wide range of alkalis and acids*

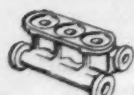
*Brinell hardness of 150 — tensiles up to 70,000 psi*

*High velocity tolerance — flow rates of 18-20 fps*

*Thread not distorted by wrenches or hammers — no leakage*



**THE METAL WITHOUT AN EQUAL**



SAND CASTINGS



CAST FLANGES



FORGINGS



CENTRIFUGAL CASTINGS



EXTRUSIONS



CAST PIPE FITTINGS



FABRICATIONS



SHEET AND PLATE



MACHINED PARTS

FB-35

When inquiring check 7717 opposite last page

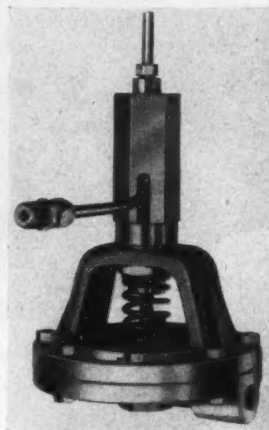
## ENGINEERING & MAINTENANCE

**Erosive process flows handled  
with minimum turbulence  
by sphincter valve . . .**

rubber seat and O-ring are only parts exposed to solids in suspension

**Uses:** Control of flow of fluids containing gritty solids or other erosive process flows.

**Features:** Design of valve produces minimum turbulence in flow, eliminates pockets, and will not plug from solids in suspension. Rubber seat and O-ring are only parts exposed to wear.



Valve design eliminates pockets which would collect solids in suspension

**Description:** Seat is compressed along its axis to produce throttling action and tight closure. Adjustable travel stop is incorporated to prevent excess pressure on seat. Tubing sizes now available are  $\frac{3}{8}$ " and  $\frac{1}{4}$ " OD. Parts may be of bronze, steel,

or stainless steel. Manual or air operators are available for quick interchange, when desired.

(Sphincter valve is product of George W. Dahl Co., Inc., Dept. CP, 430 High St., Bristol, R. I. . . or for more information check 7718 on form opposite last page.)

**Packaged mobile dust collector  
for rotary tablet presses  
easily moved . . .**

two inlets handle 370 cfm of air; filter area is 60 sq ft

**Uses:** Units provide dust collection facilities for rotary tablet presses in locations where this service is required intermittently or in varying locations.

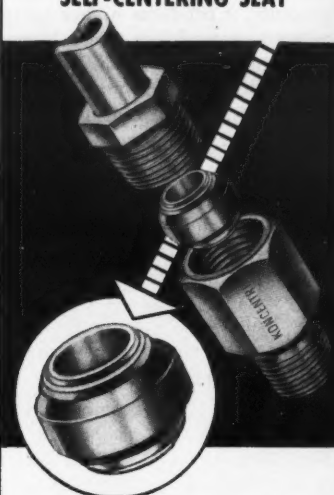
**Features:** Dust collector is a self-contained, mobile unit which can be moved from machine to machine or from place to place to meet changing plant requirements. Two inlets handle 370 cfm of air. Set of 24 filters provides 60 sq ft of filter area.

**Description:** Motor, fan, and housing are mounted in steel cabinet in conjunction with chemically-treated, spark-resistant filters to provide an efficient method of filtering within the minimum

## ONLY Koncentrik TUBE FITTINGS

(in Stainless  
Nickel and Monel)

**PREVENT LEAKS  
WITH THIS PATENTED  
SELF-CENTERING SEAT**



1. Koncentrik's exclusive, double-sealing, self-centering seat is Teflon reinforced to give you DOUBLE protection against costly, dangerous line losses. As the fitting is tightened, the "contained" Teflon rings compress into all surface irregularities, providing a leak-proof seal that is vacuum tight.

2. Heavy-duty built, Koncentrik fittings are machined from solid bar stock and forgings . . . are pressure-tight beyond burst strength of tubing.

3. Easy to install with standard flaring tools.

4. Parts are interchangeable to insure maximum economy in stocking and use.

5. The Koncentrik selection is complete . . . over 2,000 fittings for tube sizes through 2".

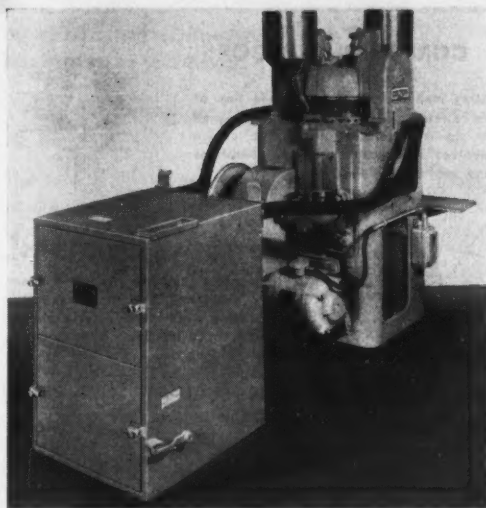
6. Prompt shipment through leading Stainless distributors from coast to coast.

The full Koncentrik line of flared-tube fittings, solder and pipe couplings, and lap-joint stub ends, is covered in our new easy-reference catalog. Included also are technical data and performance figures. WRITE FOR YOUR COPY TODAY.

**THE SPECIAL SCREW  
PRODUCTS CO.  
Bedford, Ohio**

When inquiring check 7719  
opposite last page

CHEMICAL PROCESSING



Filter unit has foot pedal control which can be used to shake filters and remove dust

space. Entire unit is 22" wide, 24" deep, and 33" high. It weighs 270 lb. Foot pedal control, outside filter unit, can be periodically operated to shake filters and remove dust.

Collector was designed for use with company's rotary tablet presses to keep working parts clean and free of dust. It should reduce maintenance costs and increase operating efficiency for those operations which produce dry dust.

(Model 66 dust collector is a product of Arthur Colton Co., Dept. CP, 3400 E. Lafayette Ave., Detroit 7, Mich. Check 7720 opposite last page.)

**Two additions to insulation line  
for temperatures up to 1600°F:  
silicas, and 85% magnesia . . .**

products are available in both pipe covering and block form

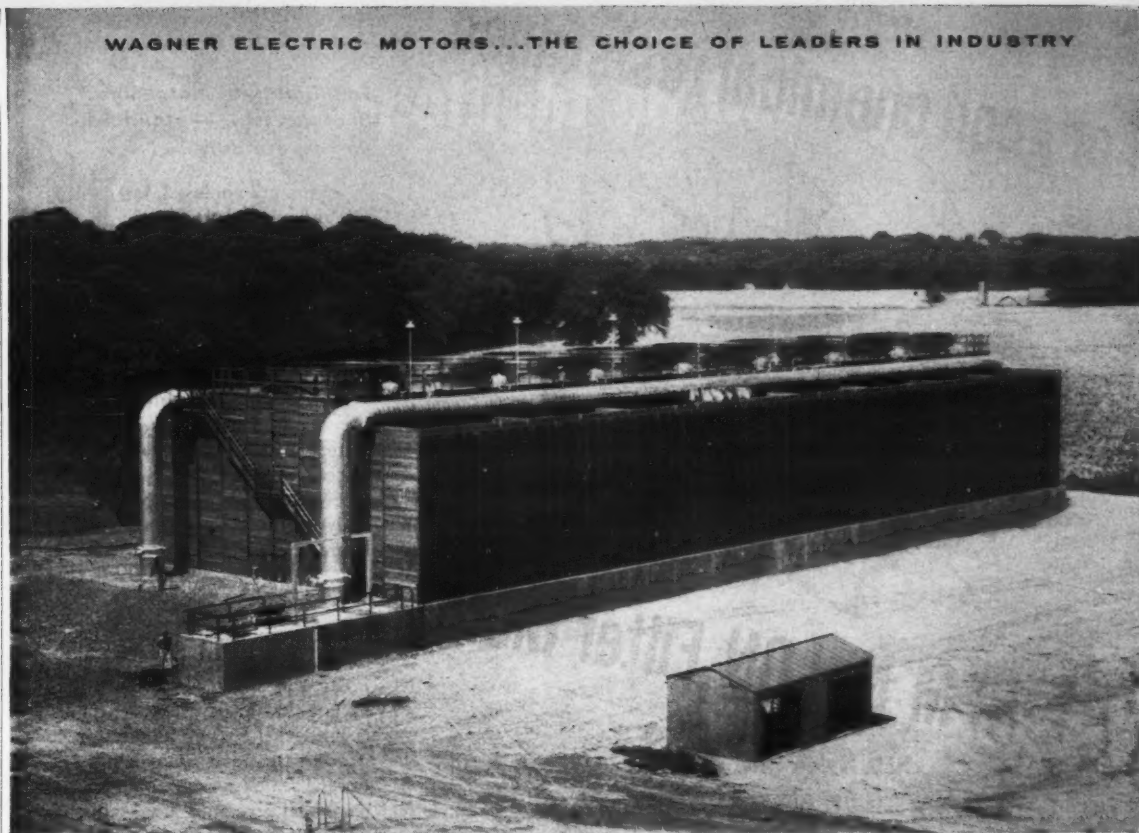
**Uses:** For industrial insulation requirements.

**Features:** Additions to line of insulating materials are an inorganic silica material (Hylo) and 85% magnesia. Silica material can be used at temperatures up to 1600°F. Magnesia is designed for use at temperatures up to 600°F or higher, in conjunction with silica product.

**Description:** Products are available as pipe covering, flat, or curved blocks. Both are lightweight, have a high compressive strength, low thermal conductivity, and closely controlled uniformity.

(Hylo and 85% magnesia are available from The Eagle-Picher Company, Dept. CP, 900 American Building, Cincinnati 2, Ohio . . . or for more information check 7721 opposite last page.)

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY



## Giant Water Cooler—powered by Wagner Motors

**Marley Cooling Tower cools 44,000 gallons of water per minute for The Kansas Power and Light Company**

This eight cell cooling tower for a power company steam plant supplies a constant flow of cooling water to lower steam pressure beyond the turbine to get more kilowatts per pound of steam.

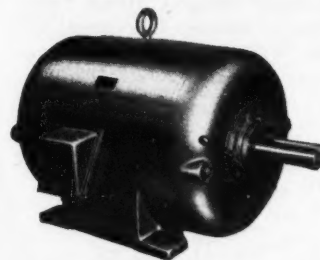
Each of the eight 240 inch fans in this tower is driven by a 50 hp Wagner totally-enclosed fan-cooled motor.

Wagner type EP Motors are well suited to rugged, hard driving, outdoor applications like this. Their totally-enclosed, corrosion-resistant cast iron frame construction protects them from the elements. They have the winding strength required to stand the shock of starting heavy loads repeatedly and the

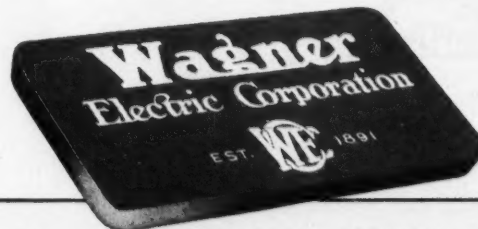
mechanical and electrical stamina to keep operating, without attention, day after day.

This exacting application is one of many where specialized requirements are met from the complete line of Wagner standard motors.

Whatever your requirements may be, there is a Wagner Motor to fit every need—a complete line for all current specifications, with a wide variety of enclosure types and mountings. Your nearby Wagner engineer can help you select the *right* motors for your needs. Call the nearest of our 32 branch offices, or write for Bulletins MU-132 and MU-203.



Wagner Type EP—Totally-enclosed fan-cooled motor. Corrosion-resistant frame. 40 to 250 hp.



WHS-8

**Wagner Electric Corporation**  
6359 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

When inquiring check 7722 opposite last page



# For good chemical resistance—



## Use NFM NYLON Filter Cloth

NFM Nylon Filter Cloth  
is not affected by

Most common alkalis

Most organic acids

Halogenated hydrocarbons

Aldehydes

Ketones

Alcohols

Carbon Bisulphide

Carbon Tetrachloride

Trichloroethylene

Benzene

In addition, the fiber strength of Nylon ranks first among all others, whether natural or synthetic. It has excellent heat resistance. It is unaffected by mold, fungi and bacteria growths. The extremely smooth surface of Nylon makes for easy cake discharge—even extremely sticky and tenacious cakes separate freely and cleanly from the face of the cloth. This is important since it reduces blinding and increases flow rates and filter capacity.

We also weave filter cloth of VINCEL†, SARAN, DYNEL, VINYON N\*\*, GLASS, DACRON††, TEFLON\*\*\*, POLYETHYLENE, ORLON\*.

... for your Filter Paper requirements try NETONE Filter Paper. High tensile strength, chemical resistant, high burst factor, abrasion resistant and crease resistant.



Weavers of Industrial Filter Media for over Fifty Years

### The National Filter Media Corp.

General Offices & Mills: New Haven 14, Conn.  
Western Office and Factory: Salt Lake City 2, Utah

Sales Offices—Representatives

Los Angeles, Calif.: 811 West 7th Street  
Chicago, Ill.: 3557 W. Peterson Ave.  
Cincinnati, Ohio: Roselawn Center Bldg.

Houston, Texas: 1503 Hadley St.  
Oslo, Norway: Nicolai Friis  
Johannesburg, South Africa: Edward L. Bateman

When inquiring check 7723 opposite last page

## ENGINEERING

**Small integral motor line  
becomes two — standard  
and severe duty . . .**

units are enclosed, fan cooled,  
and non-ventilated

**Uses:** Applications where motors will be subjected to corrosive, humid, or explosive atmospheres. Wherever one to five hp, enclosed, AC motors are required.

**Features:** Small integral motors are now offered in two lines instead of one — a standard enclosed line for normal duty and a severe duty line for highly corrosive or excessively moist atmospheres.

**Description:** Standard unit has steel conduit box and fan cover. Conduit box is gasketed with cork neoprene. Severe-duty line is basically the same as standard line except that all threaded parts are coated with special lubrication to prevent threads from seizing. Neoprene-sealed washers and special shaft seal give additional moisture protection. Conduit box and fan cover are of cast iron for greater corrosion resistance.

(Standard and severe duty small integral motor lines are product of Small Integral Motor Dept., General Electric Co., Dept. CP, Fort Wayne, Ind. Check 7724 opposite last page.)



"Looks like you've surrendered completely to automation, Jones."

## LOOK TO ATLAS FOR CORROSION PROTECTION

### CORROSION - PROOF CEMENTS

Atlas manufactures a complete line of corrosion proof cements, each designed to do a particular job. The choice involves a thorough study of conditions and materials being handled.



### PROTECTIVE COATINGS

A protective coating to solve your specific problem. The recommendation of a coating most suitable for customer conditions is a regular Atlas service.



### CORROSION PROOF LININGS

There is an Atlas tank lining to solve your corrosion problem. Atlas linings are based on the highest quality manufactured materials available. Installed at an Atlas plant or in the field.



Write for Bulletin CC#3 for complete information on the Atlas line.

When inquiring check 7725 opposite last page

## J. E. SIRRINE CO.

GREENVILLE • SOUTH CAROLINA

# Engineers

ESTABLISHED 1902



PLANT DESIGN & SURVEYS • CHEMICAL • ELECTROCHEMICAL •  
METALLURGICAL PRODUCTION • TRADE WASTE DISPOSAL •  
WATER SUPPLY & TREATMENT • ANALYSES & REPORTS

When inquiring check 7726 opposite last page

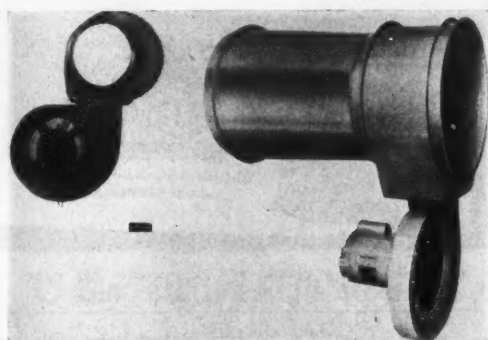
CHEMICAL PROCESSING

**Industrial venting accomplished  
by exhauster without exposing  
fan or motor to fumes . . .**

downtime required to clean and replace blades  
is materially reduced

**Uses:** Exhausting abrasives, corrosive gases,  
smoke, noxious fumes, or high-temperature mois-  
ture and steam.

**Features:** Exhauster is designed to direct in-  
jected air into a conical jet that pulls exhaust gases  
into unit and forces them into atmosphere. Fans  
and motors are not exposed to fumes. Downtime,  
commonly required for cleaning and replacing  
blades when fans are mounted in exhaust lines, is  
eliminated.



Power exhausters do not require a stack for either  
industrial venting or heating plant installations

**Description:** Units are available in capacities  
from 141,600 to 877,000 cfh with diameters of  
12, 14, 16, 18, 20, 22, 24, and 30". Power ex-  
hausters do not require a stack for either industrial-  
venting or heating-plant installations. When per-  
mitted by local code, units can be used to exhaust  
through building walls or roofs. In event of power  
failure, vent lines are not obstructed by idle fan  
blades or motors.


(Commercial power exhausters are a product of  
Quickdraft Company, Dept. CP, P.O. Box 87,  
Canton 1, Ohio . . . or for more information check  
7727 on form opposite last page.)

**Illustrates variety of V-belts  
and their applications**

Complete line of manufacturer's V-belts is illus-  
trated by cutaway views which detail construction  
features. Advantages of product in heavy-duty  
applications are outlined in eight-page catalog.


Bul V-1400-B20-P is issued by Worthington Cor-  
poration, Dept. CP, Oil City, Pa. When inquiring  
specify 7728 on form opposite last page.


# Spotlight on Quality...



**Because WELDCO Pipe and Tubing  
Are Made With the Exclusive  
Double-Fusion Welding Process**

**In every length of WELDCO  
Tubing, you get quality, uniform-  
ity, dependability . . . because  
WELDCO is produced by spe-  
cialists—men who have the experi-  
ence, equipment and facilities to  
make Pipe and Tubing to your  
exact specifications.  
WELDCO is available in Stainless  
Steel, Monel, Inconel, Nickel,  
Cupro-Nickel, and Hastelloy . . . in  
Tube and Pipe sizes from 3" to  
30", Schedules 5, 10, 40, and 80.  
For special problems, or regular  
applications, always specify  
WELDCO and be sure of getting  
top-quality, dependable products!**



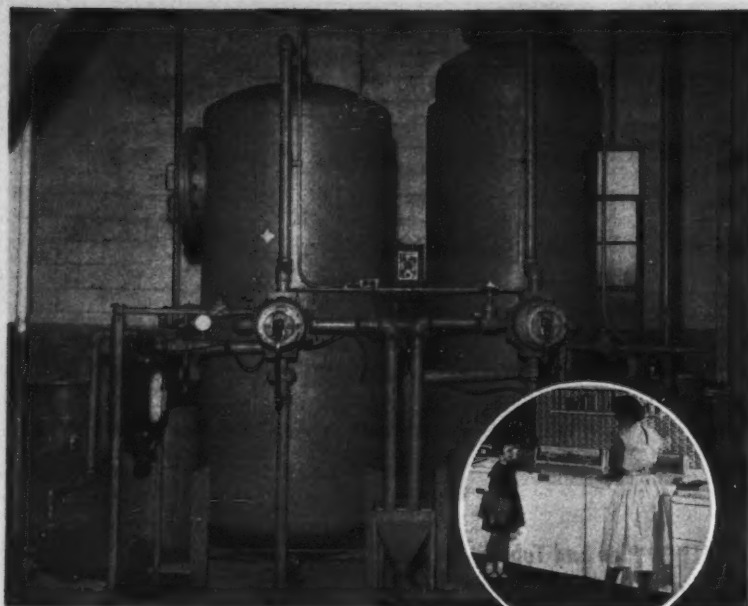


Whatever Your Needs In Tubing . . . You're Way Ahead With WELDCO

**THE YOUNGSTOWN WELDING & ENGINEERING CO. • 3724 Oakwood Ave., Youngstown 9, Ohio**

When inquiring check 7729 opposite last page

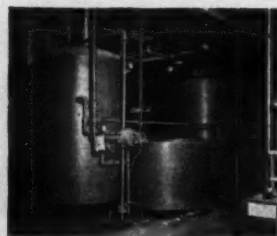




## Industrial Demineralizers help produce flawless finish for Whirlpool-Seeger

A good sales talk is backed by practical chemical engineering. The gleaming synthetic enamel and porcelain finishes on RCA WHIRLPOOL Washers and Dryers are sprayed and baked on metal parts that are prepared for finishing in chemical and steam baths and then rinsed in water. Rinse water is a critical factor . . . even the finest drinking water can leave salt spots that cause finishes to crack and chip. Whirlpool-Seeger engineers have a minimum of rinsing troubles. They use the Industrial Demineralizers pictured above to obtain rinse water as pure as commercially distilled water. Result: A beautiful, lasting finish coat with virtually no rejects due to salt spots.

The picture below shows another Industrial installation at Whirlpool-Seeger, a dual-softener for supplying soft water to the plant boilers. It cuts maintenance costs by preventing scale and thus gives a better heat transfer. The company has four Industrial installations, each designed to do a specific task . . . each has been a profitable investment.



Industrial matches equipment exactly to the job, treating every installation as a unique problem, with complete chemical analysis and survey of methods and materials. This objective engineering produces equipment that becomes a real asset to your company—a tool for quality-control and greater output. If you will outline how you use water in processing, we will be glad to make recommendations and estimates.

Write for Bulletin 201 and 211

SEE INDUSTRIAL FOR PROMPT SOLUTION TO WATER PROBLEMS

CENTRIFUGAL PUMPS • PRESSURE FILTERS • JON AND HEAT EXCHANGERS • RUBBER LININGS • WASTE TREATING EQUIPMENT

# INDUSTRIAL

FILTER & PUMP MFG. CO.

5908 OGDEN AVENUE • CHICAGO 50, ILLINOIS

*Industrial*

When inquiring check 7730 opposite last page

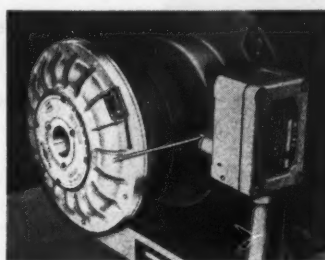
## ENGINEERING

### Overheating prevented in dry-fluid drive by cutout

Uses: Recommended especially for all unattended installations of dry-fluid drives where there is possibility of overload.

Features: Thermal cutout on dry-fluid drive prevents overheating of unit. Device automatically cuts off power and, if desired, sounds an alarm.

Description: Cutout unit consists of a trigger spring, held down by an alloy thermal pin,



Thermal cutout for dry fluid drive is easily reset by inserting new thermal pin

and a switch. Before enough heat is generated to cause damage, thermal pin melts, allowing trigger to spring out and push non-sparking striker of switch to "off" position. Unit can be reset by replacing thermal pin.

(Flexidyne dry fluid drive and thermal cutout are products of Dodge Manufacturing Corp., Dept. CP, Mishawaka, Ind. Check 7731 opposite last page.)

### Teflon packings detailed

Eight-page illustrated brochure gives service recommendations and sizes for wide variety of packings and gaskets made of Teflon. Envelope and solid gaskets, braided, plastic, and various types of valve stem packings are covered.

Form 6906 is issued by Packing Div., Raybestos-Manhattan, Inc., Dept. CP, Passaic, N.J. Specify 7732 opp. last page.

## FIRM-GRIP INDUSTRIAL GLOVES



AMERICA'S MOST POPULAR HAND SAFETY GLOVES

- **Permanent NON-SLIP** on all 5 fingers and palm. Highly efficient embossed surface is integral part of glove.
- **Curved FINGERS** for comfort and easy use.
- **Tough and Durable.** Longer wear in every pair.

SEND for catalog and prices of complete Industrial Glove line.

**SEIBERLING LATEX PRODUCTS**

Division of Standard Industries, Inc.  
NEW BREMEN, OHIO

When inquiring check 7733 opposite last page

## REPUBLIC VALVES

INDUSTRIAL • CHEMICAL • AIRCRAFT

### What! PLUG VALVES THAT TURN EASILY AT 65° BELOW!! WITH NO LUBRICANT!!!

Up to 250°, down to -65° F, is the range of Republic's LO-TEMP selector valve. Easy turning, positive sealing, at pressures to 100 psi. Tapered TEF-LON plug requires no lubricant, and is not affected by acids or alkalis.

Aluminum body for aircraft and general use, stainless steel for chemical, food, and dairy industries. Angle, 2, 3, 4-way, with or without drain, flanged for panel mounting.

Write for Bulletin No. 754. Distributors in principal cities from coast to coast.



RM

REPUBLIC MANUFACTURING CO.

15655 BROOKPARK ROAD • CLEVELAND 11, OHIO

When inquiring check 7734 opposite last page

CHEMICAL PROCESSING

Catwalk's construction gives  
usable floor space beneath



### Glidden cuts labor cost 50% using slotted-angle steel to build catwalk

Structure 39 ft long by 2½ ft wide  
was finished in 20 hr

Savings in labor cost of 50% were realized when the Glidden Company constructed a catwalk to service paint vats at their St. Louis plant. Seven new vats had been installed to add to productive capacity.

Catwalk, 39 ft long by 2½ ft wide, was built in 20 hr using a slotted, cold-rolled, steel angle with an electro-galvanized finish. All-purpose steel framing has slots and round holes spaced at three-inch intervals to enable rapid assembly and provide adaptability.

Structure was suspended from ceiling, eliminating need for uprights fastened to floor. This resulted in usability of floor space under catwalk. A wrench and special cutter were the only tools that were needed for installation.

(Dexion slotted angle is manufactured by Acme Steel Company, Dept. CP, 2840 Archer Avenue, Chicago 8, Ill. . . . or for more information reader may simply check 7735 on the convenient Reader Service slip which is located opposite last page.)

Protect against product spoilage

with...

FULLY-ENCLOSED, AUTOMATIC

**ALEMITE**

# Accumatic

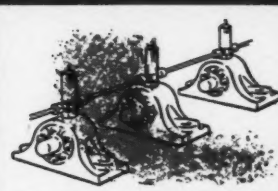
CENTRALIZED LUBRICATION



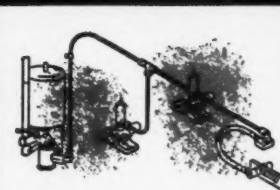
Can be built into any machine,  
in **4 easy steps**



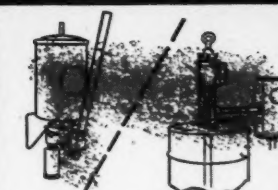
1. Replace grease cups or grease fittings with Accumatic fittings. (Available in same thread sizes as grease fittings, cups.)



2. Connect Accumatic fittings with copper tubing. (Alemite has tubing, clips and accessories for fast, neat installation.)



3. Connect sliding, rotary or oscillating parts into tubing system. (Flexible hose and swivels available for moving parts.)



4. Provide central pump to supply lubricant to system. (May be ordinary hand pump or fully automatic barrel pump.)

Product spoilage due to inaccurate hand lubrication of equipment is a needless waste. But with fully-enclosed Alemite Accumatic Lubrication you eliminate dripping oil and grease. Alemite keeps the lubricant where it belongs—in the bearing! This completely automatic system delivers a clean, exact amount of lubricant to all bearings. No over-lubrication. Serves up to 400 bearings. Accurate down to .005 cu. in. of lubricant!

#### Offers All These Advantages!

- Prevents application of wrong lubricant.
- Seals completely against dirt, grit, water.
- No parts are neglected—lubricates inaccessible and dangerous bearings.
- Eliminates product spoilage due to over-lubrication.
- Eliminates point-by-point lubrication methods—services all bearings in one operation.
- Delivers exact amount of lubricant to bearing.

# ALEMITE

REG. U. S. PAT. OFF.

A Product of STEWART-WARNER CORPORATION

STEWART  
SW  
WARNER

## FREE!

Alemite, Dept. D-96  
1850 Diversey Parkway, Chicago 14, Illinois

Please send me my free copy of the Alemite Accumatic Catalog.

Name \_\_\_\_\_

Company \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



When inquiring check 7736 opposite last page



*Any DRY MATERIALS*

# THE BLENDING RESULTS YOU WANT AND NEED!

## THE PATTERSON THORO BLENDER

*Perfectly Blended IN 5 MINUTES OR LESS*



The correctly-engineered Patterson ThoroBlender delivers intimate, completely homogeneous blends of free-flowing materials in minutes—even with extreme variations in particle sizes and densities. Gentle, thorough action disperses each particle on a different path through the batch—protects delicate crystals and flaky materials from breakage. Let Patterson study your blending application and recommend the ThoroBlender suited to your jobs.

### The Patterson Foundry and Machine Company

East Liverpool, Ohio, U. S. A.

NEW YORK, BOSTON, BALTIMORE, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI, ATLANTA, CHICAGO, ST. LOUIS, TULSA, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE

The Patterson Foundry and Machine Company, (Canada) Limited  
Toronto, Canada  
MONTREAL

When inquiring check 7737 opposite last page

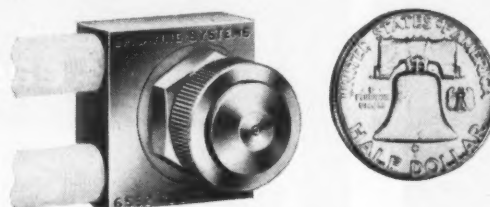
### ENGINEERING & MAINTENANCE

**Small size is greatest advantage of pneumatic atomizing nozzle for compact installations**

overall body of unit is about equal in size to diameter of a half-dollar

**Uses:** In pneumatic atomizing applications where space is at a premium.

**Features:** Atomizing nozzle is very compact. Overall body is only 1 1/4" high x 1-5/32" wide — about equal to diameter of a half-dollar. Body itself measures only 1/2" thick.



Liquid and air inlets of atomizing nozzle are on same side to aid compactness of installation

**Description:** Liquid and air inlets are on same side of unit to aid in compactness of installation. Nozzles are supplied in wide range of capacities, in choice of round, wide-angle round, and flat sprays. Material of construction is brass or stainless steel. Depth of nozzle cap and set-up will depend on type employed.

(6552-1/8 JAC nozzle is a product of Spraying Systems Co., Dept. CP, 3216 Randolph St., Bellwood, Ill. Check 7738 opposite last page.)

**Water temp controlled to  $\pm 2^\circ\text{F}$  even if there is a 75% drop in inlet pressures . . .**

water mixer valve automatically shuts off if either supply fails

**Uses:** Thermostatic mixer valve for use wherever control of delivered-water temperature is required.

**Features:** Mixer valve holds water delivery temperature to within  $\pm 2^\circ\text{F}$  under any of these conditions:

1. A 75% drop in inlet pressures.
2. A 45°F fluctuation in hot-water supply temperature.
3. An 85% restriction of discharge flow.

Unit automatically shuts off if either supply fails, or if the thermostatic liquid-filled motor itself fails.

**Description:** Mixer-valve units are factory set to deliver water at any temperature between 65 and 115°F. An 85-160°F range can be furnished on order.

## PUMPS for the PROCESSING INDUSTRY

...that SERVE WELL and LAST!

**CORROSION EROSION or other PHYSIO-CHEMICAL PROBLEMS**

Fig. 19,488

To Chemical Engineers who cope with such problems: Taber builds pumps of metals or alloys which the Engineer has found effectively resistant to the specific chemical solution to be pumped. Stability of Taber design never gives way to design for selling purposes. You can get repair parts or duplicate Taber pumps for years.

**SUGGESTION:**  
On your business stationery, WRITE FOR:

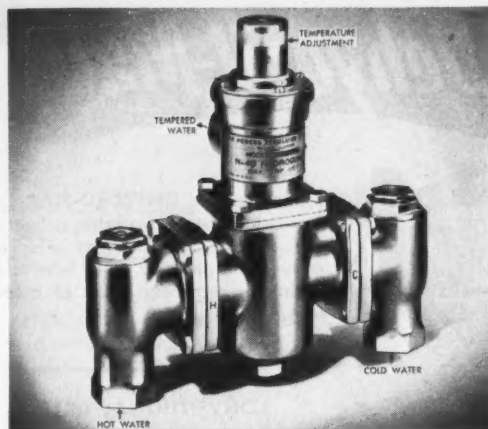
**BULLETIN V-837**

**TABER PUMP CO. Est. 1859**  
320 ELM ST., BUFFALO 3, N.Y.



When inquiring check 7739 opposite last page

CHEMICAL PROCESSING



Mixer-valve can be serviced without shutting off main water supply

Maximum-temperature settings can be lowered by a simple adjustment, which can be locked to prevent tampering. Stop valves built into unit permit it to be serviced without shutting off main water supplies. Valves can be completely dismantled without removing it from line, using only standard wrenches. Unit will operate in any position. It is available in 45 and 125 gpm capacities.

(Type N Hydroguard mixer-valve is a product of The Powers Regulator Company, Dept. CP, 3434 Oakton St., Skokie, Ill. Check 7740 opp. last page.)

**Washable, electrostatic filter  
designed for high dust  
concentrations . . .**

unit is self-charging and can be cleaned by simply immersing in warm water

**Uses:** Electrostatic cleaning of air for heating, ventilating, and air conditioning systems.

**Features:** Filters can be cleaned by simply immersing in warm water. Improved design overcomes problems in applications where dust concentration is unusually high, where large particles impinge on filter surfaces, and where effective single-pass filtration is required.

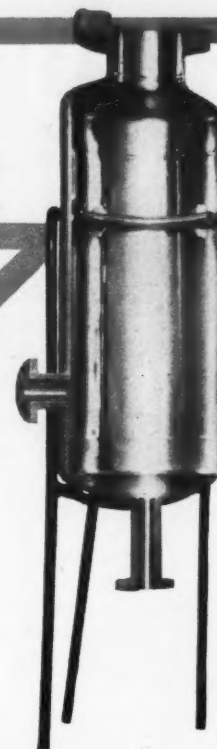
**Description:** Cleaner is constructed in three sections. Intake side is a screen of vinylidene chloride. Outlet side is made of a plastic-bonded, glass-fiber mat. Sandwiched between is shredded polyethylene film. Cilia-like serrations along edges of individual film particles form a greater surface area to generate stronger electrostatic charges and to inhibit shifting of filtering surface.

(Heavy Duty Plotron electrostatic air cleaner is a product of Industrial Products Div., Goodyear Tire & Rubber Co., Dept. CP, 1144 E. Market St., Akron 16, Ohio. Check 7741 opposite last page.)

**This clad steel can do anything  
solid high alloy can do!**

**...and save us up to  
50% in material costs!**

Clad steel demonstration  
unit featured at the  
Nat'l Assoc. of Corrosion  
Engineers show.



**COMPARE THE VALUE!**

■ Throughout the chemical and petrochemical industries, clad steel offers superb value when compared with any other material used for tanks, pressure vessels and related equipment.

Only with clad steel can you get the protection of solid high alloy—with savings in material costs up to 50%. You get the most economical safeguard against corrosion, abrasion and product contamination. You eliminate high maintenance costs and the risk of unscheduled shutdowns from equipment failure. You have the freedom to change design and equipment layout as your needs change.

Maintenance is simple because little stays long on those smooth surfaces that a quick flush with water can't remove.

There's an end to seepage and crevice corrosion because of the permanence of the integral bond between cladding and backing steel. Modification is easy—walls can be cut and flanges or pipes welded on anywhere.

And only Lukens offers a selection of 16 cladding and 11 backing metals—a selection that will meet virtually any conceivable need.

For more information consult your equipment builders or write Manager, Marketing Service, Lukens Steel Company, 843 Lukens Building, Coatesville, Pennsylvania. Outline your interests and we'll show you in detail just why we say clad steel is the ideal material for long range economy.



**SEE FOR YOURSELF!**

**ECONOMY**—high-alloy layer assures corrosion resistance, long equipment life.  
**STRUCTURAL STABILITY**—low-cost backing steel provides strength and rigidity.  
**DESIGN FREEDOM**—integral bond allows design and fabrication of shapes to meet process and space needs.

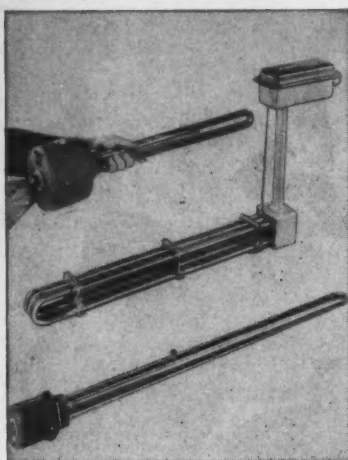
**LUKENS CLAD STEELS** LUKENS

**STAINLESS-CLAD • NICKEL-CLAD • INCONEL-CLAD • MONEL-CLAD**

Producers of the Widest Range of Types and Sizes of Clad Steel Plates and Heads Available Anywhere

When inquiring check 7742 opposite last page





## CHROMALOX Electric IMMERSION HEATERS

with or without  
built-in thermostats  
... fit the heat to your need  
up to 100,000 watts  
and 2,500 psi

Full range of sizes and ratings in portable, screw-plug and flanged types. Available with copper, steel or alloy sheaths to resist corrosion.

Used for heating water, asphalt, greases, molten salts, pickling and plating baths, process kettles; for superheating steam and compressed air; for melting lead, solder, babbitt; and for a wide range of similar applications.

Let the Chromalox Sales-Engineering staff solve your heating problems... electrically.

Write for your copy of  
Catalog 50

—for full information on the complete line of Chromalox Electric Heaters and controls.

For ideas on additional applications of electric heat, request Booklet F1550—"101 Ways to Apply Electric Heat."

**Edwin L. Wiegand Company**

7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania



EDWIN L. WIEGAND COMPANY  
7517 Thomas Boulevard, Pittsburgh 8, Pa.  
I would like to have...

- ☐ a copy of Catalog 50
- ☐ a copy of "101 Ways"
- ☐ a Sales-Engineer contact me.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

A-4487A

When inquiring check 7743  
opposite last page

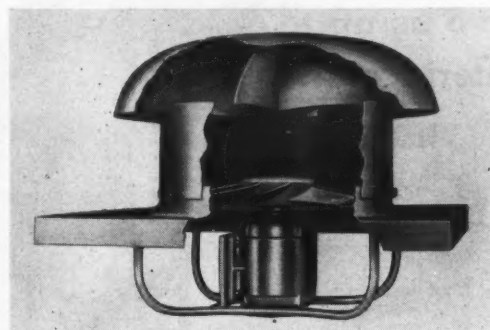
## ENGINEERING & MAINTENANCE

**Quieter operation is provided  
by head and blade design  
of roof ventilator...**

guide vanes reduce noise and turbulence,  
wheel tip speed is low

**Uses:** Industrial roof ventilation of fumes,  
smoke, or dust.

**Features:** Hollow, die-formed airfoil fan blades  
and head of roof ventilator reduce noise level and



Roof ventilator units handle up to 34,430 cfm

turbulence to a minimum. Design of blades allows lowest possible wheel tip speed. Guide vanes spin exhaust air into the atmosphere with reduced turbulence.

**Description:** Fan blade diameters range from 9 to 48". Outputs range from 350 to 34,430 cfm. Totally enclosed motors are mounted on rubber vibration isolators and supported by heavy-gage pipe to provide minimum air-flow resistance with maximum strength. Square-cut mounting base for fan motor provides a lower silhouette. Overall height of mushroom-shaped ventilator does not exceed 1 1/2'.

(Silent-vent roof ventilator is a product of Detroit Blower Co., Dept. CP, 9867 Pacific Ave., Franklin Park, Ill. . . . or for more information check 7744 on form which is located opposite last page.)

### why is this magazine so "different"?

Maybe you have wondered why this magazine, CHEMICAL PROCESSING, has such an unusual format? Or why its articles are so terse, short, to-the-point?

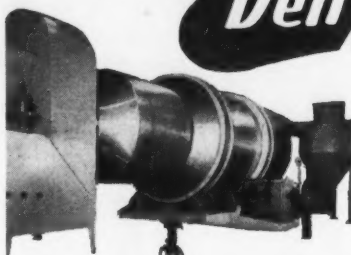
The Editors explain how this benefits you—page 100.

## Chemicals are Dried Quickly, Economically

in....

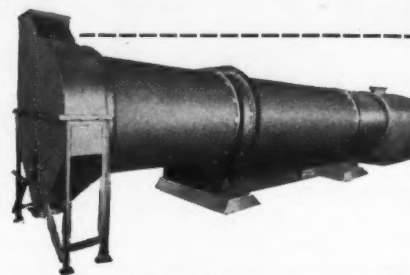
# DehydrO-Mat

PAT. PENDING



### Steam-heated DEHYDRO-MAT

Low temperature, variable-inclination, rubber-tired DehydrO-Mat dries ammonium nitrate and other hard-to-dry chemicals requiring hours of hold-up time.



### CONVENTIONAL DRYER

Heavy-duty rotary unit with furnace, burner, breeching and air-handling system. Used for ammoniated granular fertilizers and other chemicals.



Literature and information on request.

When inquiring check 7745 opposite last page

operation:

FULLY AUTOMATIC. SAFE,  
HIGH PURITY. ECONOMICAL

results:

PURE NITROGEN WITH  
CONTROLLABLE HYDROGEN CONTENT  
PRODUCED AT LOWEST COST

application:

FOR MATERIAL OR PROCESS

## NITRONEAL GAS GENERATOR

Pure nitrogen is produced by this equipment with a controllable hydrogen content that can be varied to meet changing requirements and maintained at any desired percentage between .25% and 25%.

Write for additional data on how the Nitroneal Gas Generator can be applied to your process or in your plant.

Request FREE,  
informative booklet No. 21.



**BAKER**  
& COMPANY, INC. **PRECIOUS METALS**

113 ASTOR ST., NEWARK 5, N. J.

ENGELHARD INDUSTRIES  
NEW YORK • SAN FRANCISCO • LOS ANGELES • CHICAGO

When inquiring check 7746 opposite last page

CHEMICAL PROCESSING

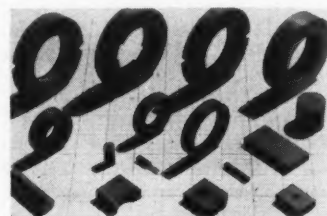
**Ceramic magnet material  
is not affected by  
surroundings . . .**

will retain energy in presence  
of strong opposing fields

**Uses:** All conventional permanent magnet uses as well as those where magnets may be exposed to strong demagnetizing fields.

**Features:** Ceramic permanent magnet material combines adequate energy product with high coercive force, low residual induction, high electrical resistivity, and ability to resist demagnetization by another magnet of a force up to 2000 gauss.

**Description:** Material is fabricated from barium and iron oxides and is classified among hard



Ceramic magnet material is available in a variety of sizes and shapes

magnetic materials. Energy product is  $0.915 \times 10^6$  gauss-oersteds @ 600 gauss working point. Electrical resistivity is  $6 \times 10^{10}$  ohms/cm cube.

Units will exert little or no proximity effect on nearby circuitry. Temperature characteristics are linear, including retrace, to 400°C. Magnets are available in variety of sizes and shapes and are machineable by wet grinding after magnetizing.

(Ceramagnet is a product of Electronics Components Div., Stackpole Carbon Co., Dept. CP, St. Marys, Pa. Check 7747 on form located opposite last page.)

For more information on product at right, specify 7748 . . . see information request blank opposite last page.

... you get

**21% to 42%  
MORE ELBOW  
for the same cost**

When You Use  
**MIDWEST**  
"LONG TANGENT"  
ELBOWS



### ADVANTAGES OF MIDWEST "LONG TANGENT" ELBOWS

- ★ They save pipe.
- ★ They often eliminate short nipples and their extra welds.
- ★ They save time and money in lining up and clamping pipe and fitting.
- ★ They make it easier to apply slip-on flanges.
- ★ They remove the circumferential weld from point of maximum stress and can be sleeved.
- ★ THEY COST NO MORE THAN OTHER ELBOWS.

The long tangents available only on Midwest Welding Elbows give you more fitting for the same price . . . Midwest "Long Tangent" Elbows cost no more than other elbows. This added length has numerous advantages for the user of welded piping . . . advantages that save money and improve piping. For all the facts, ask the nearest Midwest distributor or write us for Catalog 54.

### MIDWEST PIPING COMPANY, INC.

Main Office: 1450 South Second Street, St. Louis 4, Mo.  
Plants: St. Louis, Clifton, N.J. and Los Angeles

#### Sales Offices:

New York 7—50 Church St. • Chicago 3—79 West Monroe St.  
Cleveland 14—616 St. Clair Ave. • Los Angeles 33—520 Anderson St.  
Houston 2—1213 Capitol Ave. • Tulsa 3—224 Wright Bldg. • Miami  
34—2103 Le Jeune Rd. • Boston 27—426 First St.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES



# CHEMISEAL GASKETS

and accessories for chemical piping

**Chemiseal Jacketed Gasket, Type 1-339 WA.** Compressed asbestos sandwiched between woven asbestos and enclosed in a Teflon envelope. Ideal for glass-lined steel connection. Catalog No. TG-953.

**Chemiseal Snap-on Type 820 Gaskets.** Molded to match contour of conical-end glass pipe, they assure perfect automatic centering of joints and free flow of medium. Made for all standard pipe sizes from 1/4 in. to 6 in. Catalog No. TG-953.

**Chemiseal Expansion Joints, No. 212, and Flexible Couplings, No. 202,** absorb shock and vibration, thermal expansion and contraction. Correct misalignment. Connect unlike piping ends and nozzles. Catalog No. EJ-1155.

**Chemiseal Adaptors No. 2-CRS,** provide a tight, safe seal between unlike piping ends and nozzles. A steel bearing ring provides rigidity. Resilient core assures safe seal at low bolt loads. Teflon Jacket protects and contains easy-to-handle single unit. Catalog No. TG-953.

**Chemiseal Reducers No. 3-CRS** are one piece assemblies similar to type 2-CRS, but designed to connect unlike pipe sizes with minimum length requirements. Standard sizes from 1 in. to 6 in. Bulletin No. 3-CRS.

Ask your U.S. Gasket—Belmont Packing Distributor or write for literature.

**UNITED STATES GASKET CO.**  
Camden 1, New Jersey



**U.S. GASKET • BELMONT PACKING**

When inquiring check 7749 opposite last page

## ENGINEERING & MAINTENANCE

**Non-porous rubber compound is very soft, can be used at temp to 200°F . . .**

has softness characteristic of 5 durometer

**Uses:** To absorb vibration, dampen sound, as an air-tight seal, shock mount, or as an insulator.

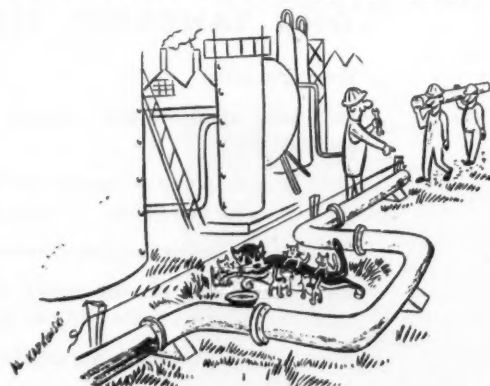
**Features:** Rubber is non-porous, solid, and supersoft. It has a softness characteristic of 5 durometer. It can be used at temperatures up to 200°F.



Soft rubber compound can be vulcanized or bonded to metal or other materials

**Description:** Material is a reasonably good electrical insulator and can be vulcanized or bonded to metal or other materials. Rubber is available in sheets or strips up to 1" thick, or company will mold or bond it to metal or odd shapes to meet customer's needs.

(RRD-992 rubber compound is product of Roth Rubber Co., Dept. CP, 1860 S. 54th Ave., Chicago 50, Ill. . . . or for more information check 7750 on form opposite last page.)



Another cartoon from Al Kapkowski, Esso Standard Oil Co., Bayway Refinery, Linden, N. J.

THE  
*Chemical  
Industry's  
Choice*

**COAST TO COAST**

**Practi-Kreme . . .** This combination skin protector and cleaner has been used and proved to check dermatitis *before* it starts — for over 15 years. Applied before work, it provides a flexible, fat-based coating over the skin. When moistened after work, Practi-Kreme cleans completely and quickly.

**New Phlo Waterless Cleaner . . .** Safe, quick and easy to use, Waterless Phlo removes all industrial soils. Containing both silicone and lanolin for double protection, it is milky white, smooth in consistency. New handy dispenser makes using and refilling a simple matter. Management and workers agree — coast to coast — there's no better cleaner than Phlo Waterless.

**Phlo . . .** is a neutral skin protector rich in lanolin and now fortified with silicones. Magic silicones make Phlo water-repellent, adhesive, non-toxic. Phlo is a most effective barrier against bacteria, irritants and soil. Try it . . . then you'll know Phlo should be in your plant now.



Write for free test samples today.

THE  
*Chemical*  
**CORPORATION**

63 Waltham Ave. • Springfield 9, Mass.

When inquiring check 7751  
opposite last page

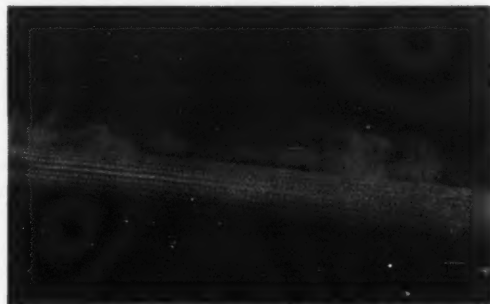
CHEMICAL PROCESSING

**Porous-wall tubing now available  
fabricated from high quality  
glass fiber-epoxy laminate . . .**

several degrees of porosity can be obtained by varying manufacturing conditions

**Uses:** Physical, electrical, and chemical characteristics make tubing suitable for re-usable filters where corrosion resistance is critical, and for low cost, reinforced forms for potting and impregnating coils, resistors, or terminal boards. It can also be used in high-temperature, Class H motor housings.

**Features:** Through variations of glass fiber weave, epoxy compound, and impregnation process it is possible to produce tubing with several



Porous tubing is available in a choice of cross-sections: round, square, oval, or triangular

degrees of porosity. Glass fiber-epoxy tubing is impervious to most gases, fuels, oils, and chemicals.

**Description:** Product is available in choice of cross-section: round, square, oval, or triangular. Standard lengths up to 9 ft are supplied, with greater lengths available on request. Tubing has high-temperature resistance, up to 350°F. It can be supplied in diameters down to 0.062" ID, with wall thicknesses as small as 0.005". Material weighs 0.03 lb/cu in.

(Poro-Tube is a product of Lamtex Industries, Inc., Dept. CP, 51 State St., Westbury, L.I. N.Y. Check 7752 opposite last page.)

**Seven folders discuss factors  
behind chemical cleaning**

Seven individual factors that have been found to be of prime importance in chemical cleaning operations are discussed in turn in seven folders. Folders take the reader behind the scenes of chemical cleaning service.

Seven folders on chemical cleaning are issued by Dowell Incorporated, Dept. CP, PO Box 536, Tulsa 1, Okla. Specify 7753 opp. last page.

# 17 pump-years of service at \$1<sup>52</sup> per month for repair parts

The three Type G LaBour pumps in this picture have delivered a total of seventeen years of service to the Sharon Steel Corporation, Sharon, Pa. The first pump was installed in 1948, the second in 1949, and the third in 1953. The pumps are handling pickling solutions at 100° to 120° F.

Sharon Steel Corporation has purchased \$930 worth of parts for these pumps, some of which were spare parts not for immediate use. Counting them all, however, it figures only \$18.25 per pump per year of service.

Since fewer part replacements are required, the true saving made possible by LaBour pumps is greater than the mere comparison of parts cost. Usually the labor and down-time are more costly by far than the parts themselves.

If you're after real economy in pumping corrosive liquids, you'd better look at LaBour. When *all* the figures are in—first cost and maintenance total—after years of service, LaBour is the bargain pump of the field.



ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

# LABOUR

THE LABOUR COMPANY, INC. • SHARON, PENNSYLVANIA • U.S.A.



When inquiring check 7754 opposite last page



**No solder or gaskets needed  
for sight glasses sealed  
directly to metal . . .**

hermetically sealed units are not affected by aging or vibration

**Uses:** As sight glasses for chemical processing equipment where long wearing, no-leak characteristics are desired.

**Features:** Produced to customer specs, glass is hermetically sealed directly to metal. Solder and gaskets are not required and the windows show no leaks when tested on a helium leak detector at maximum sensitivity. They are unaffected by aging or vibration.

**Description:** Glass can be mounted in almost all ferrous and non-ferrous metals. Units have been fabricated in diameters from 3/16 to 3". Thicknesses have varied from 1/16 to 1/4". Other sizes can be made. Sight glasses 3/8" in diameter and 1/8" in thickness have been operated at pressures in excess of 5000 psi. Pressure resistance is dependent on size and shape of individual units.

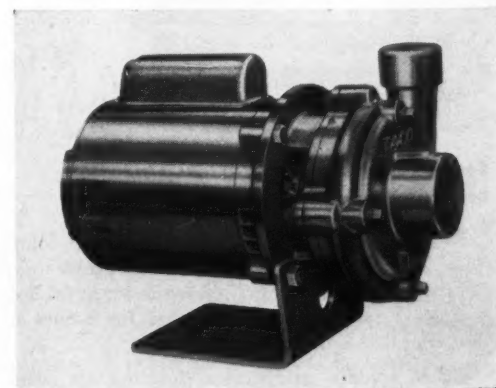
(Sight glasses are a product of Corning Glass Works, Dept. CP, Corning, N.Y. . . . or for more information check 7756 opposite last page.)

**Simplified design eases maintenance  
of centrifugal pump in field . . .**

no lubrication is required on rotating parts

**Uses:** Units provide dependable service in general pumping applications in 1/3 and 1/2 hp range.

**Features:** Design of centrifugal pump has been simplified so that any servicing required can be done in field, with tools normally carried by service men. No lubrication is required.



Centrifugal pump has self-adjusting, self-lubricating mechanical seals

## FLEXITALLIC IS A WAY OF THINKING

Consider the job that a FLEXITALLIC Spiral-Wound Gasket must do in high pressure process piping, in boiler and other pressure vessel "windows", in containing corrosive chemicals, and in steam lines of ships at sea.

In these and similar applications, where engineers are seriously concerned with confining fluids safely, notice the blueprints. See how often they call for Flexitallic Spiral-Wound Gaskets. It's "engineering's" way of thinking — safely.

More than 40 years ago, Flexitallic ushered in a new era of high-temperature, high-pressure sealing. Today, with flange standards of 2500 lbs. and 1050°F., Flexitallic Gaskets assure the safety of operating personnel, while protecting property valued in the billions of dollars.

Each Flexitallic Gasket is designed and engineered to meet specific conditions of thermal and physical shock, corrosion, vibration, weaving and un-

predictable joint stresses. Spirally-wound V-ripped plies of required metal with alternating plies of proper filler result in a resilient gasket having controlled compression characteristics like those of a precalibrated spring.

Flexitallic Gaskets are at highest efficiency when bolted up cold at a predetermined load. For all pressure/temperature ranges from vacuum to 10,000 lbs., from extreme sub-zero to 2000°F. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285".

**FLEXITALLIC GASKET CO.**  
8th & Bailey Sts., Camden 2, N. J.  
*Representatives in principal cities*

**Flexitallic**  
SPIRAL-WOUND GASKETS

FOR FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

**PERFECT FOR  
PROCESS APPLICATIONS**

The ideal seal for many process applications is a Flexitallic Gasket with Teflon trapped between edges of stainless steel. Ask for folder, "Teflon in Flexitallic Gaskets."

\*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue—it's our exclusive blue-dyed Canadian asbestos filler

When inquiring check 7755 opposite last page

**Description:** Impeller is of closed type, balanced for smooth, noiseless, and efficient operation. Motors furnished are 3450 rpm, 60 cps, single phase. Heavy stamped-steel base permits slightly out-of-line pump connections without causing noisy performance or damaging unit.

(Series 170 centrifugal pumps are product of Taco Heaters, Incorporated, Dept. CP, 1160 Cranston St., Cranston 9, R.I. Check 7757 opp. last page.)

#### Where and why to use fire brick

Four-page, illustrated folder discusses why and how to use fire brick in chemical and industrial processing applications.

Tech Bul 105 is available from The Ironton Fire Brick Company, Dept. CP, Ironton, Ohio. When inquiring specify 7758 opposite last page.

**After you've read an article,  
do you often . . .**

#### Want More Information?

Ever read a magazine article and think — "Now there's something I'd like to know a little more about?"

Probably you have . . . because no matter how long the article, it can't tell you everything. But how do you get more information? Perhaps the magazine didn't tell you . . . and you're too busy to hunt here and there for a name and address . . . a source of further information. So — maybe a good, profitable idea is not followed up, not put into practice in your operations.

When you read CHEMICAL PROCESSING you come to no such "dead ends." Every article has been selected as worthy of your valuable reading time . . . the non-essentials have been edited out . . . brief, factual material remains . . . AND, at the end of every article a "source" paragraph tells you where to get more information.

Convenient for you . . . and NOTHING MISSING. Remember, the manufacturer's name and address along with a "key number" at the end of an article is there as an editorial service for you. (Did you wonder, "Is this a new form of advertising?") That information is added to each story by the editors to help you, the reader.

THE EDITORS

# LQ600 VALVES

- NO LEAKAGE • NO EROSION
- NO WIRE DRAWING
- ... In 100,000 applications  
and 5 years of tests

Famous LQ600 Bronze Valves, with revolutionary Brinalloy seats and discs, now solve maintenance problems in a new wider range of services!

The lower pressure LQ600-150 made valve history during five years of cost-cutting use in a big variety of installations, ranging from "normal" to "exceptionally severe."

Now the higher pressure LQ600-200 offers all the same proved features — plus a stronger body and bonnet of exclusive Lunkenheimer S-1 Bronze. It has a total temperature rating of 550°F.

It will pay you to specify and install LQ600 in your toughest 150 and 200 lb. services. New Brinalloy seats and discs resist wear and corrosion to an amazing degree — far greater than 500 Brinell Stainless Steel . . . even outwear case hardened Stainless Steel exceeding 1000 Brinell. The flat seats and discs are micro-optically lapped to a perfect fit — and brazed in to stay.

Call your Lunkenheimer distributor  
or write The Lunkenheimer Company,  
Box 360, Cincinnati 14, Ohio.

BRONZE • IRON • STEEL • PVC

**LUNKENHEIMER**  
THE ONE *Great* NAME IN VALVES

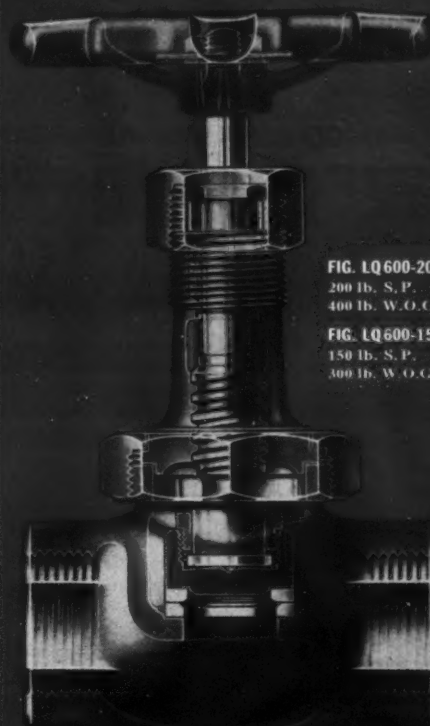
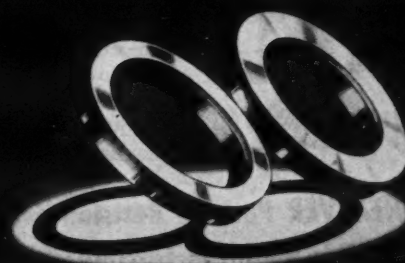


FIG. LQ600-200  
200 lb. S. P.  
400 lb. W.O.G.

FIG. LQ600-150  
150 lb. S. P.  
300 lb. W.O.G.

**NOW AVAILABLE FOR**  
200 LB. S.P. 550°F. 400 LB. W.O.G. and  
150 LB. S.P. 300 LB. W.O.G.

#### APPLICATIONS



BRINALLOY\* SEATS AND DISCS

\*Patented Alloy — TM Reg.

When inquiring check 7759 opposite last page





# News

## Wherever CORROSION RESISTANCE is a Factor HAVEG... Industry's Standard For CONQUERING CORROSION



### in STORAGE AND PROCESS TANKS

Large Haveg tank installations have been in continuous use for twenty-five years, under extreme corrosive conditions.



### in FUME REMOVAL

Lightweight Haveg fume duct, hoods, stacks and fittings handle corrosive fumes and gases at temperatures up to 350° F.



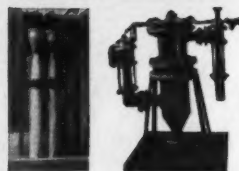
### in CHEMICAL FLOORING

Haveg resin cements for brick and tile floorings, equipment linings, are ready for use within 24 hours.



### in PROCESS PIPE AND FITTINGS

Haveg pipe and fittings, in several different plastic materials, may be flanged, threaded, cemented, or bell end-connected where required.



### in COLUMNS, HEAT EXCHANGERS

Absorbing Towers, Chlorine Coolers and Vacuum Scrubbers designed by Haveg Engineers to meet your requirements with guaranteed performance.

## ... WHEREVER Positive Resistance to Corrosive Materials and Fumes is Required for Improved Process Operations

No other material offers as wide a range of effective resistance to corrosive acids, hypochlorites, salts, alkalis, and solvents as the Haveg plastics. Skilled Haveg engineers will assist you in selecting or developing equipment to solve your particular corrosion problems. Custom design

and field service is part of every Haveg process installation, to assure you full advantage of Haveg's low net cost. Contact a qualified Haveg representative, or write for Haveg Bulletins C-13 and G-10 for details of the complete line of Haveg corrosion resistant equipment.

H-603

HAVEG PLASTICS OF TOMORROW SOLVE YOUR CORROSION PROBLEMS TODAY

**HAVEG INDUSTRIES, Inc.**

924 Greenbank Road, Wilmington 8, Delaware  
Factory: Marshallton, Del. phone WYman 8-2271

Atlanta Chicago Cleveland Detroit (Livonia) Los Angeles New York (Westfield, N.J.) Seattle  
Exchange 3821 DElaware 7-6088 WASHINGTON 1-8760 KENwood 1-1785 Mutual 1105 WESTfield 2-7383 Main 9006

When inquiring check 7760 opposite last page

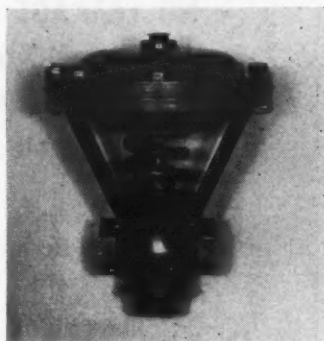
## ENGINEERING

### Small and rugged flow valve ...

unit is designed for gas, oil, water, or steam service

Uses: On-off service, air-to-close or air-to-open.

Features: Valve is designed for long life and low maintenance. It is recommended for gas, oil, water, or steam service.



Valve is available with bodies of cast bronze, cast iron, cast steel, or stainless steel

Description: Unit has semi-steel topworks. Body materials are cast bronze, cast iron, cast steel, and stainless steel. Either metallic or composition discs are used as standard trim and working pressures are 150 to 300 psi. Sizes available are 1/4 to 1".

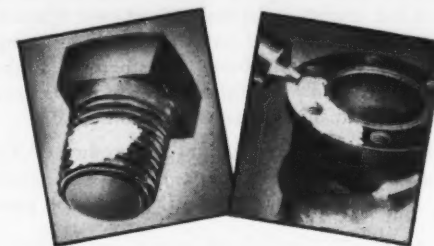
(Uniflow valve Series 700 is produced by Uniflow Valve Corp., Dept. CP, 19 Quine St., Cranford, N.J. Check 7761 opposite last page.)

### Capacity charts given for spray nozzles

Industrial spray nozzles are thoroughly discussed in 20-page, illustrated catalog. Capacity charts for individual items permit accurate selection of unit best suited for applications. Representative uses are outlined.

Cat "I" is issued by Monarch Manufacturing Works, Inc., Dept. CP, 2501 E. Ontario St., Philadelphia 34, Pa. Specify 7762 opposite last page.

## THE ANSWER TO THOSE DIFFICULT LEAKING-JOINT PROBLEMS!



*The tough, clinging film of Leak Lock stretches rather than breaks*

Leak Lock has the ability to hold chemical solutions and gases that would eat through ordinary joint compounds. It has extraordinary adhesion and remains flexible indefinitely.

During the past six years, Leak Lock has found its place in the chemical, petroleum, atomic energy, electronic, refrigeration and many other industries in constantly increasing uses for special purposes and as the answer to many "unsolvable" joint problems.

If you have a leaking joint problem, send for information and a sample of Leak Lock. Stewart Industries, Inc., 16 Colfax Avenue, Clifton, N. J.

# Leak Lock

When inquiring check 7763 opposite last page

## GASKETS · SHIMS WASHERS

**From 1 to 1 Million**

No matter what type, thickness, shape or quantity required, you can count on Chicago-Wilcox for uniformly accurate gaskets, shims, washers or special stampings.

With 50 years accumulation of dies, chances are we can furnish just what you need without a die charge—thus reducing costs substantially and assuring on-schedule delivery.

Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics... teflon, nylon, etc. . . . and in quantities to meet your production requirements.

Write for catalog and submit your specifications for quotation.

**CHICAGO-WILCOX MFG. CO.**

7717 South Avalon,  
Chicago 19, Illinois

When inquiring check 7764 opposite last page

CHEMICAL PROCESSING

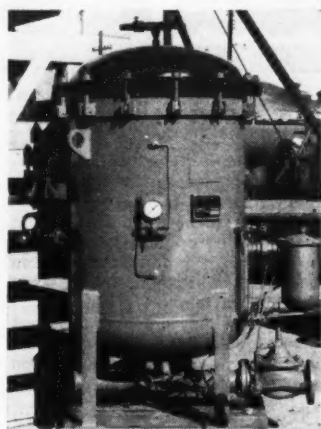
**Removes 99.95% of water,  
solids down to 5 microns  
from fuel supplies . . .**

filter-separator handles solvents  
and aromatics also

**Uses:** Removal of water and  
solids from liquid hydrocarbons,  
jet fuels such as JP-3, JP-4, JP-5,  
aviation gasoline, kerosene, diesel  
fuel, solvents, and aromatics.

**Features:** Filter-separator re-  
moves solids down to 5 microns.  
Design assures water separation  
to 99.95% of inlet water content.

**Description:** Water separation  
and filtration is accomplished by  
one pass through specially treated  
Fiberglas cartridges with synthetic-  
fiber sock attached. Unit contains



Cartridge in separator-filter has  
screw base for easy removal

screw base cartridges. It has a  
swing-bolt cover with mechanical  
lifting jack. Automatic controls are  
available to remove water as it is  
collected.

(Vertical separator/filter is a prod-  
uct of Warner Lewis Co., Div. of  
Fram Corp., P.O. Box 3096, Tulsa  
8, Okla. . . . or for more informa-  
tion reader may simply check 7765  
on the convenient Reader Service  
slip located opposite last page.)

For more information on prod-  
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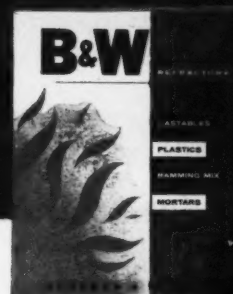


# What are your refractory castable problems

?

- High Temperatures?
- Abrasion and Erosion?
- Slag Attack?
- Overhead Applications?
- Insulating Properties  
Required?

B&W makes a wide range of  
specialized refractory castables.  
Whatever your problem, you will find  
helpful data in B&W Bulletin R-35.  
Send for your copy today.



## Table of Products and Uses

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**BABCOCK  
& WILCOX**

THE BABCOCK & WILCOX CO.  
REFRATORIES DIVISION  
GENERAL OFFICES: 181 EAST 42nd ST., NEW YORK 17, N.Y.  
WORKS: AUGUSTA, GA.





## R/M Teflon PACKINGS... tops for acid, caustic and solvent service

Hundreds of plants have proved that R/M "Teflon" packings are the surest way to solve the most difficult sealing problems. Not only do they have a longer service life than conventional packings, but the equipment they are used on lasts longer, too.

R/M's complete line of "Teflon" products for chemical and solvent service includes these outstanding mechanical packings:

**R/M 843**—Made by extruding a plastic mix of "Teflon" and other compounds into an open, cotton-braided jacket. For use in pumps handling dilute acids and chemicals.

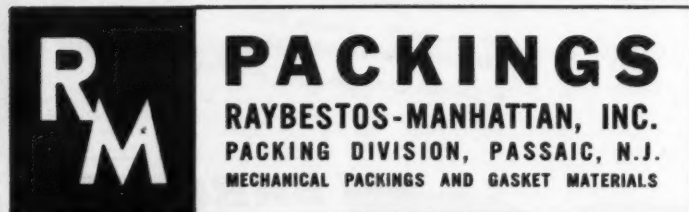
**R/M 847**—A braided and cross-locked "Teflon" filament packing, which is dry except for the impregnation with "Teflon" suspensoid. For valves handling solvents, strong acids and corrosive fluids.

**R/M 848**—Made like 847, except that the dry packing is lubricated with a high-temperature, chemical-resistant material. For use on pumps where solvents, slurries and concentrated acids are involved.

R/M engineers are experts on fabricating "Teflon" in combination with asbestos and other materials, and will be glad to help you with special problems. Write today for booklet on R/M "Teflon" packings.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex, Vee-Square, Universal Plastic, and "versi-pak"; GASKET MATERIALS, "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR

\*Du Pont trademark



**FACTORIES:** Bridgeport, Conn.; Manheim, Pa.; Neenah, Wis.; No. Charleston, S.C.; Passaic, N.J.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

**RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Radiator Hose • Clutch Facings • Laundry Pads and Covers • Bowling Balls**

When inquiring check 7767 opposite last page

## ENGINEERING & MAINTENANCE

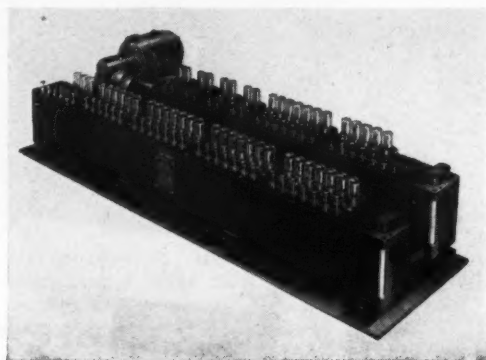
**Specified amount of lubricant delivered to required spot by lubricator . . .**

length of plunger stroke remains constant regardless of quantity delivered

**Uses:** Lubrication of mechanical equipment.

**Features:** Each pumping unit of lubricator delivers an exact quantity of lubricant to desired spot. Regardless of how small setting is for oil delivery, plunger stroke remains the same.

**Description:** Pumping unit can be used for pressures up to 6000 psig. It can be combined in any number of multiples to deliver lubrication to any number of specified locations. Lubricators are driven by common gear motor and drive is taken from back lubricator into front lubricator, in two-bank arrangements, by way of a geared shaft. Units containing the desired number of pumping sections can be designed and fabricated by manufacturer.



Lubricators can supply any required number of individual locations from single unit

(Model 82-V lubricators are product of Manzel Div. of Houdaille Industries, Inc., Dept. CP, 315 Babcock Street, Buffalo 10, New York . . . or for more information about manufacturer's product, reader may simply check 7768 on form which is located opposite last page.)

Yes . . .

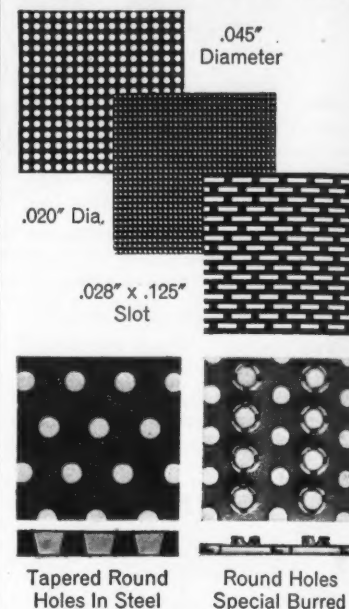
### CHEMICAL PROCESSING

is "different!"

There are good reasons why!

See letter from the Editors, page 100.

## H & K Perforated Screens CORROSION RESISTANT MADE FOR LONG LIFE



We are well-experienced in the perforating of screens in stainless steels, monel metal and other alloys.

Screens can be cut to shape or size with margins or unperforated areas as required. Perforated screens can be furnished in practically any material from foil thin to 1" thick.

Contact either H & K office or one of our agents. We will be glad to work with you on your perforated screen requirements.

**FILL IN AND MAIL  
COUPON TO OFFICE  
AND WAREHOUSE  
NEAREST TO YOU.**



## THE Harrington & King PERFORATING CO.

Chicago Office and Warehouse 5636 Fillmore Street Chicago 44, Ill. New York Office and Warehouse 110 Liberty Street New York, N. Y.

Please send me—

- ☐ GENERAL CATALOG NO. 62
- ☐ STOCK LIST of Perforated Steel Sheets
- ☐ SAMPLES of Perforated Plastics and Paper
- ☐ PRICE INFORMATION (NOTE: Send specifications of perforated materials wanted. If necessary send drawings or sketches.)

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check 7769 opposite last page

CHEMICAL PROCESSING

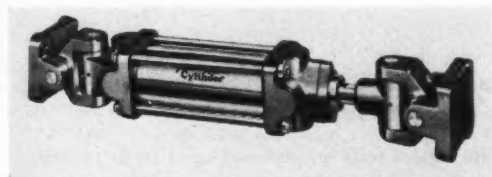
**Solves problem of misalignment  
between hydraulic cylinder  
and work load . . .**

universal mounting gives positive protection  
against damage to load or cylinder

**Uses:** Mounting air or hydraulic cylinders, particularly where they are connected to structures that are riveted, bolted, or welded together.

**Features:** Cylinder mountings eliminate problems due to misalignment between cylinders and their loads, thereby reducing costs associated with breakage of mechanical devices and cylinders.

**Description:** Units are available in two forms: a hinge-mount cylinder with universal-mounting brackets at each end, and a cylinder with universal trunnion and universal-mounting bracket for rod end. Cylinders with bores from 1½ to 3 inches are available in both cushioned and non-cushioned styles.



Universal cylinder mountings compensate for deflection and misalignment

(Universal mounting brackets are product of Hanna Engineering Works, Dept. CP, 1765 N. Elston Ave., Chicago 22, Ill. . . . or for more information check 7770 on form which is located opposite last page.)



"Smedley, it looks like you've really got something this time!"

# How a Major Chemical Company Cut Steam Costs \$100,000 Annually



## Armstrong Traps were a "Major Factor" in Steam Conservation Says Chief Engineer

Steam waste has a way of creeping up on you. Especially in older plants. The losses can make a staggering total.

Plants looking for a way to fight rising costs can well take a page from the 8-point steam conservation program that netted a major chemical plant \$100,000 annual saving:

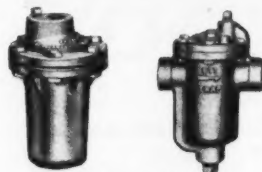
1. Waste steam utilized — all flash steam recovered for building heating.
2. New steam traps installed — Armstrong traps replaced old traps throughout the plant, indoors and out.
3. Steam leaks repaired.
4. Insulation repaired.
5. All condensate recovered.
6. Steam piping simplified.
7. Steam turned off when not needed.
8. Preventive maintenance improved to insure a continuous checkup on sources of waste.

In commenting on the program, the Chief Engineer of the plant stated, "4000 new Armstrong steam traps were one of the major factors in conserving steam. The traps, plus improved installation practice, have reduced annual trap maintenance parts and labor by \$25,000 as compared to traps previously used."

Want all the facts? Tips on cost-saving standardized trap hookups? Facts about Armstrong traps? Ask for:

1. The No. 1, 1956 issue of the Armstrong Trap Magazine containing complete details, drawings and photos.

2. The 44-page Armstrong Steam Trap Book, a fact-full guide to better trapping.



Trap sizes and styles  
for every condensate drainage job.



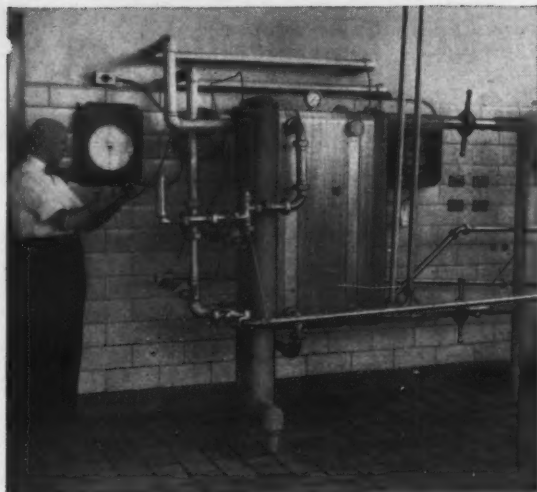
Call your local Armstrong Representative or write:

**ARMSTRONG MACHINE WORKS**  
880 Maple St., Three Rivers, Michigan

# ARMSTRONG STEAM TRAPS

When inquiring check 7771 opposite last page





## He's keeping tabs... on what!

You can't tell from this photo what's going on inside this Cherry-Burrell "Superplate" heat exchanger.

This versatile plate-type heat exchanger could be heating... cooling... regenerating... or Shorttime pasteurizing an almost endless variety of liquid products.

But regardless of product, "Superplate" assures higher heat transfer rates. The electropolished stainless steel plates in this totally enclosed circuit have from 2 to 5 times more heat exchange surface per pound of product than tubular equipment.

And since "Superplate" during cooling transfers as much as 80% of a product's heat units directly to another product being heated, your heating and cooling costs are substantially lower.

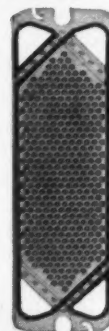
For all the cost- and space-saving facts about "Superplate," contact your Cherry-Burrell Representative. Or write for literature.

Exclusive Electropolished Plates, in either 304 or 316 stainless, give greater resistance to corrosion and product deposits.

Three-Dimensional Turbulence set up by patented knobbed design accelerates heat transfer with low pressure drop.

Nonclogging Flow Space between plates, full length.

Largest Port Areas of any plate for low fluid pressures.



**CHERRY-BURRELL**

427 W. Randolph Street, Chicago 6, Ill.

Dairy • Food • Farm • Beverage • Brewing  
Chemical • Equipment and Supplies

SALES AND SERVICES IN 58 CITIES—U.S. AND CANADA

When inquiring check 7772 opposite last page

## new literature

### Glass-reinforced polyester laminates and molded items listed in booklet

Laminates and molded items produced by combining alkyd-base polyester resins, inorganic powdered fillers, and glass reinforcement are covered in 12-page booklet. Designed for use in electrical insulating, the laminates come in a number of grades, which are described. The laminates satisfy need for a class B insulating material that combines the good qualities of phenolic, melamine, and silicone laminates, the bulletin points out.

"Haysite" is issued by Reinforced Plastics Div., Hays Manufacturing Co., Dept. CP, 12th and Liberty St., Erie, Pa. When inquiring check 7773 on form opposite last page.

### Covers engineering details of water filters

Illustrated, 12-page bulletin covers uses, features, and engineering details of pressure sand and gravel filters. Cutaway views of both horizontal and vertical filters are shown and details of strainers, distributor systems, and piping arrangements given. Table gives capacities, sizes, and space requirements.

Bul WC-107 A is issued by Graver Water Conditioning Co., Division of Graver Tank & Mfg. Co., Inc., Dept. CP, 216 W. 14th St., New York 11, N. Y. When inquiring specify 7774 on form opposite last page.

### How molybdenum sulfide works as lubricant

Functions of molybdenum disulfide Moly-Sulfide in chassis grease, its properties, and current technological status are explained in eight-page bulletin.

Bul Lu-8a is issued by Dept. L, Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. When inquiring specify 7775 on the convenient Reader Service slip which is located opposite last page.

Industrial bulletins pertinent to the reader... offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of the magazine

### Bulletins deal with pelletizers

Dicing cutters, or pelletizers, designed for producing pellets from plastic or rubber material extruded or rolled in sheet form, are described in two four-page bulletins. Photographs, charts, and drawings illustrate design, construction, and cite specifications.

Bulletins on pelletizers are issued by Taylor Stiles & Co., Dept. CP, Riegelsville, N. J. When inquiring specify 7776 on form opposite last page.

### Results of tests of wood adhesives on 10 to 16 year old samples

Results of tests on plywood aged 10 to 16 years under various exposure conditions are summarized in four-page data sheet. Urea, resorcinol, and phenol resins are covered.

Bul No. 72a is issued by Chemical Div., The Borden Co., Dept. CP, 350 Madison Ave., New York 17, N.Y. When inquiring specify 7777 on form opposite last page.

### Corrosive and explosive fumes handled by fan

Six-page publication covers line of industrial fans designed to handle corrosive and explosive fumes at high temperatures and humidities. Fans described are belt-driven tubeaxial units.

Bul 620 is issued by Propellair Div. of Robbins & Myers, Inc., Dept. CP, Springfield, Ohio. When inquiring specify 7778 on form opp. last page.

### How to flat vinyl lacquers

Formulation and test data on flattening vinyl lacquers with Syloid® 244 synthetic silica are presented in six-page bulletin.

"Syloid 244" is issued by Davison Chemical Co., div. of W. R. Grace & Co., Dept. CP, 101 N. Charles St., Baltimore 3, Md. When inquiring specify 7779 on form opposite last page.

**Describes hardness tester  
for metals or plastics**

Data sheet of two pages describes portable hardness tester for aluminum, aluminum alloys, copper, brass, other materials including plastics. Conversion chart is included relating instrument reading to Rockwell, Brinell, Vickers numbers.

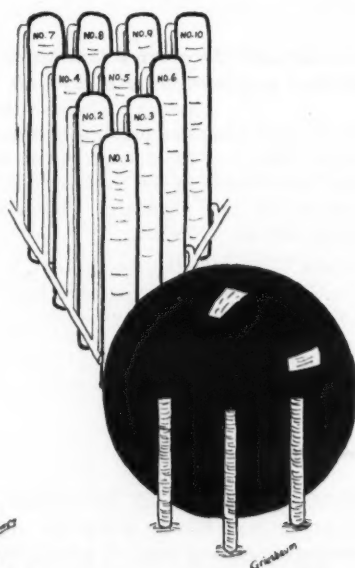
Data sheet "Impressor" is issued by Barber-Colman Co., Dept. CP, 1300 Rock St., Rockford, Illinois. When inquiring, check 7780 on form opposite last page.

**Stitch with colored wire**

Describing line of colored wire for stitching corrugated boxes, data sheet in color contains descriptions and offers color chips.

For use with manufacturer's stitching method or other stitching equipment, wire is available in 12 finishes.

"Color Stitch" selection guide is available from Acme Steel Company, Dept. CP, 2840 Archer Avenue, Chicago 8, Ill. When inquiring specify 7781 on form opposite last page.



"This plant's sort of a memorial to the chief's 300 game last year."

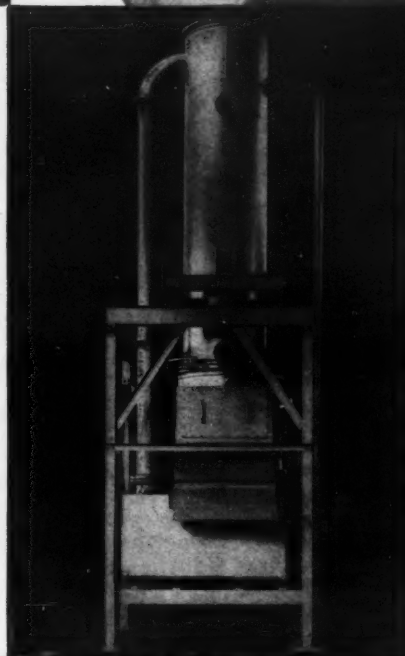
Cartoon by Cy Griesbaum, The Fluor Corp., Ltd., Los Angeles, California.



**\*If your process  
involves a liquid  
that will solidify  
when cooled....  
....this machine  
can do it...then  
discharge and size  
the substance....  
all automatically**

**Vogt**

**"What is your processing problem?"**



If you have a processing problem, perhaps the Vogt Automatic Tube-Type Molding Machine will provide the answer because it will form and size any liquid that will solidify when cooled, and will discharge by gravity upon heating.

Now in use by major chemical companies, these units have achieved tremendous savings in labor while producing a more uniform product. Also, since the process involves "freezing" or solidifying the substance while it circulates through tubes, the quality of the product is often superior to that of the original charge.

The wide range of uses to which Vogt Tube-Type Molding Machines have been adapted indicates their definite value in the chemical processing field. Adaptation possibilities are virtually unlimited and you may request detailed technical information from our engineers without obligation.

Address Dept. 24-RCIP

*Automatic Tube-Type*

**MOLDING MACHINE**

**HENRY VOGT MACHINE CO., LOUISVILLE, KY.**

When inquiring check 7782 opposite last page



# WALWORTH

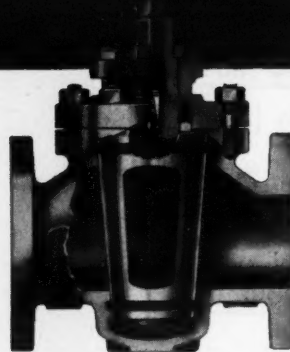
## LUBRICATED PLUG VALVES

*Better because* ... They are pressure sealed with an insoluble lubricant readily renewed while the valve is in service. Lubricant completely surrounds the plug ports assuring a tight seal against leaks. It also insures ease of operation by reducing friction between the body and the plug while at the same time protecting the finished surfaces against corrosion and wear.

Walworth Lubricated Plug Valves are the most satisfactory valves available for the handling of gritty suspensions, and many other destructive, erosive, and corrosive industrial and chemical solutions.

They are ideal for general refinery and pipeline service.

For full information see your Walworth Distributor, or write for your copy of Bulletin 111. Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Lubricant system of a Walworth No. 1700F Regular Gland, Wrench Operated, Steel-Iron, Lubricated Plug Valve. Other Walworth Lubricated Plug Valves include Single Gland, and Ball Bearing types. Sizes to 30-inches — pressures to 5,000 psi, and for vacuum service.

# WALWORTH

Manufacturers since 1848

valves ... pipe fittings ... pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

When inquiring check 7783 opposite last page

## NEW LITERATURE

### Book of 101 pages available on wrought iron

One chapter of 101-page book on wrought iron discusses the corrosion resistance of the metal and its ability to withstand fatigue fracture. Considerable other information is given, showing how the metal can be used to advantage in particular applications. Book serves as a comprehensive technical guide to anyone interested in wrought iron and its manufacture and uses. Numerous photographs have been employed to further illustrate the various phases of the subject.

"Wrought Iron, Its Manufacture, Characteristics, and Applications" is published by A.M. Byers Company, Dept. CP, Clark Bldg., Pittsburgh 30, Pa. Specify 7784 opposite last page.

### This is story of titanium dioxide

The whiteness of fresh snow is 95% of "pure white." The best grade of Unitane titanium dioxide is rated at 98. The story of how it's made, purified, and the applications to which it is put is unfolded in this 20-page illustrated "cinemascope" brochure.

"The Story of Unitane TiO<sub>2</sub>" is issued by Pigments Div., American Cyanamid Co., Dept. CP, Bound Brook, N.J. When inquiring specify 7785 on form opposite last page.

### Industrial and decorative laminates and their applications are covered

High grade laminated products of nylon, asbestos, cotton fabric, or paper impregnated with phenol and cresol-condensation thermosetting resins are covered in this eight-page illustrated bulletin. Many uses are described.

Folder 1933 "Farlite Laminates" is issued by Plastics Div., Farley & Loetscher Mfg. Co., Dept. CP, Dubuque, Iowa. When inquiring check 7786 on form opposite last page.

### How to prepak

Picturing a number of pre-packaged consumer items, 28-page booklet points out advantages of pre-packaging and suggests appropriate products. Booklet describes manufacturer's design and test services and suggests ways in which packages would aid merchandising.

"How to Prepak" is issued by Hinde & Dauch, Dept. CP, Sandusky, Ohio. When inquiring specify 7787 on form opposite last page.

CHEMICAL PROCESSING

### Case history data on finned tube for heat exchangers

A number of actual plant installations where finned heat exchanger tube has been used to advantage are cited in 18-page booklet. Each case history is written in the problem, solution, results form. One of advantages pointed out in many of the applications is 50% or more increased heat capacity obtained with finned tube over conventional tube heat exchanger.

"Opportunities Unlimited" is issued by Wolverine Tube, Div. of Calumet & Hecla, Inc., Dept. CP, Guardian Bldg., Detroit 26, Mich. When inquiring specify 7788 opposite last page.

### Shows glass tube flow meters

Including performance characteristics, bulletin describes glass tube variable area flow meters. Catalog is 16 pages in two colors. Details are given on models available, various tubes and floats, construction, and accessory equipment. A section of the booklet is devoted to extensions and secondary instruments which can be used with the meters.

Catalog 10-A25 is issued by the Fischer & Porter Company, Dept. CP, 692 Jacksonville Road, Hatboro, Pa. When inquiring specify 7789 on form opposite last page.

### Metallized ceramic coating for hard solders

Four-page bulletin presents information on a metal-to-ceramic coating with a surface to which a metal part or other metallized ceramic parts may be hard soldered up to 2200°F. Extreme refractory qualities of ceramic defy attack of solders of the copper-silver, silver, and pure copper types.

Bul 1155 is issued by Frenchtown Porcelain Company, Dept. CP, 160 Muirhead Ave., Trenton 9, N.J. Specify 7790 on form opposite last page.

Yes . . .

### CHEMICAL PROCESSING

is "different!"

There are good reasons why!

See letter from the Editors, page 100.



## When it comes to water conditioning . . . HOW MUCH "TOLERANCE" CAN YOU AFFORD?

Very little, probably, if your plant is typical. You know, of course that exacting water treatment is required to make your local water supply precisely right for your use. But you know, too, that there are as many variations in water needs as there are industries.

As Elgin installations in hundreds of plants and institutions can testify, it is our business to design, build and install water conditioning equipment that will best meet your requirements — within exacting tolerances.

As specialists in water conditioning for nearly half a century, we have been face to face with nearly every water treatment problem imaginable. If, for example, your operations call for simple ion-exchange softening, Elgin can offer water softening equipment — in a wide range of capacities —

together with an Elgin ion-exchange zeolite especially tailored to do the job with efficiency and economy. For boiler feed or process water, Elgin can provide filtration, neutralization, de-alkalization, de-aeration, de-mineralization or de-gasification. Even if you need water of *highest known chemical purity*, Elgin can offer you the Ultra-Deionizer . . . for water of greater chemical purity than that produced by triple distillation—at a *tiny fraction of the cost*.

Talk over your water conditioning problems with your Elgin representative. The entire Elgin engineering staff is at your service to help solve the problem quickly and inexpensively. Or, if you'd rather, please feel free to write directly to us for any information you may need.



### ELGIN SOFTENER CORPORATION

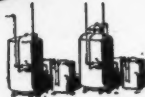
180 No. Grove Avenue, Elgin, Illinois

Representatives in Principal Cities

In Canada: G. F. Sterne & Son, Brantford



SOFTENERS



ION EXCHANGERS



FILTERS



DEIONIZERS



DEALKALIZERS



LIME COAGULATORS



DEGASIFIERS

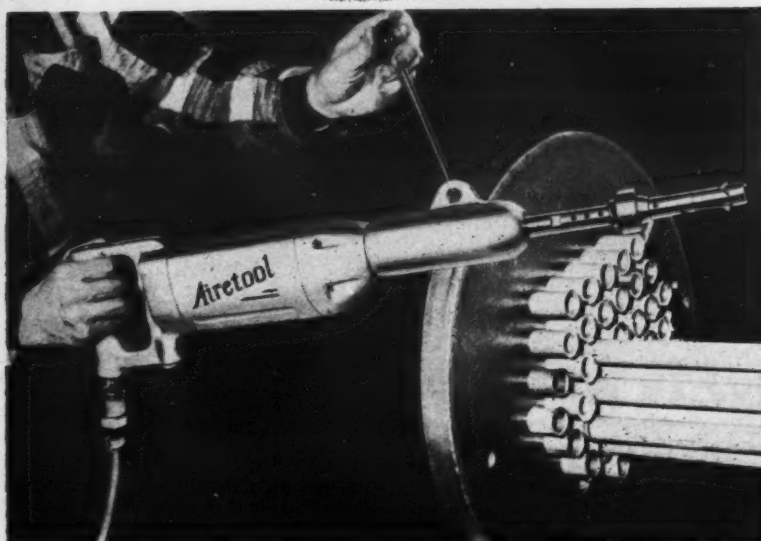


DEAERATING HEATERS

When inquiring check 7791 opposite last page



# CUTS TUBES FASTER!



## AIRETOOL'S *NEW* air-driven internal tube cutter

AIRETOOL'S new, lightweight, portable tube cutter removes damaged or leaky heat exchanger and condenser tubes faster and more economically than ever before. Self-centering, double-action, hardened steel tool bits cut nonferrous and steel tubes  $\frac{5}{8}$ " to 1" in diameter, through tube sheets 1" to 4" thick. Operator governs rate of cut through positive feed control, eliminating gouging or burning and increasing life of tool bits. The new single-stage air-driven motor, designed and precision built by AIRETOOL, is powerful and easy to use. Available in speeds of 200, 265, 335 and 625 r.p.m.

AIRETOOL'S new tube cutter is also available with electric driven motor for use where air supply is not available, and in a push-type design which can be adapted for use with your own electric or air motors. AIRETOOL Internal Tube Cutters are an economical necessity, invaluable for tube maintenance programs.



Send for Bulletin #59, illustrating the complete new line of AIRETOOL tube cutters, cleaners, expanders, accessory and specialty tools.



REPRESENTATIVES in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii. EUROPEAN PLANT: Vlaardingen, The Netherlands

When inquiring check 7792 opposite last page

## NEW LITERATURE

### Lists safe loads for slings

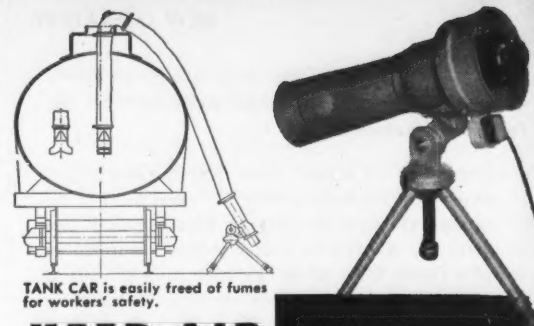
Two-color booklet of four pages, lists the safe loads for slings of 20 sizes wire rope when used at various angles of application. Information is listed to cover slings varying from  $\frac{1}{2}$ -ton safe load to 48.7 tons safe load. Bulletin and chart listings should be valuable to riggers, superintendents, and plant engineers, having problem of lifting loads with overhead cranes and hoists.

Bul 5308-R is issued by the Macwhyte Company, Dept. CP, Kenosha, Wis. When inquiring specify 7793 on form opposite last page.

### Describes, specifies DC amplifiers

Illustrated four-page data sheet describes general uses of DC amplifiers and provides hook-up schematics. Engineering specifications are also included.

Data Sheet 80-1 is issued by Robertshaw-Fulton Controls Company, Dept. CP, 2920 N. Fourth Street, Philadelphia 33, Pa. When inquiring specify 7794 on form opp. last page.



## KEEP AIR FRESH

in confined places  
with COPPUS

### Design "A" Ventilator

Improve workers' safety—health—comfort—efficiency. Get rid of dangerous gases, fumes, stagnant air. Coppus Design "A" Ventilator ventilates tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments, fuselages. For complete information, write Coppus Engineering Corporation, 389 Park Ave., Worcester 2, Mass. Sales Offices in Thomas' Register.

Other "Blue Ribbon" Products in Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory and Mining Catalogs.



CHEMICAL STILL is here ventilated while being repaired.



When inquiring check 7795 opposite last page

## PUMP

### Liquids • Gases • Slurries

WITHOUT CORROSION  
OR CONTAMINATION



Prices range from .....\$55 to  
depending on size of pump and  
accessory equipment required. \$500

Write for Catalog

## SIGMAMOTOR Inc.

18 North Main Street • Middleport, N. Y.

When inquiring check 7796 opposite last page

CHEMICAL PROCESSING

**Book gives pointers on how to improve office reports, manuals, records**

Improving office reports, manuals, and records is subject of 54-page publication. Author points out that there are three steps that can be taken to increase value of reports as a management tool: 1) isolate and build the report structure around key elements of performance that determine short- and long-term profit results, 2) develop yardsticks for measuring kind of job that is to be done for each of these elements, and 3) present information in a form that is easy for the non-accounting executive to understand. Also included in book are discussions on records management and office communications.

To obtain Office Management Series No. 141, remit \$1.75 (\$1 for AMA members) direct to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, New York.

**Corrosion-resistant strapping subject of insulation manual**

Insulation manual of approximately 50 pages contains recent information on corrosion-resistant metal strapping for insulation. Series of corrosion-resistant metals currently being applied for this use is covered. Extensive corrosion charts and other technical data will assist people applying insulation to determine the correct strapping material for specific atmospheres. Recently developed metals described give strength and durability while actually reducing the width and thickness of strapping material. Another helpful feature of manual is series of case histories presented.

Steel strapping insulation manual is issued by A. J. Gerrard & Co., Dept. CP, 1950 Hawthorne Ave., Melrose Park, Ill. When inquiring specify 7797 on form opposite last page.

**Describes four heat-resistant aluminum paints**

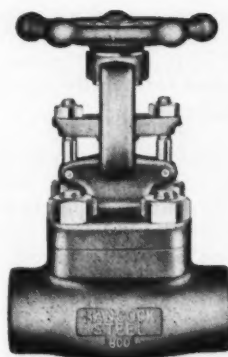
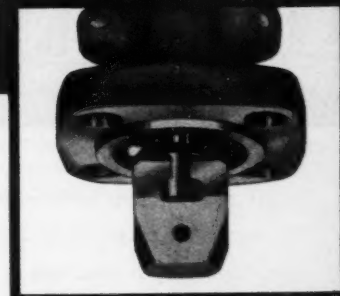
Illustrated, four-page bulletin discusses four high-heat-resistant aluminum paints, including two fortified with silicone, and one made with 100% silicone resin. Text recommends appropriate paint for various maintenance situations, taking into consideration the amount of moisture, intensity of heat, and exposure to weather.

"Heat-Resistant Aluminum Finishes" is issued by Industrial Finishes Information Service, Cook Paint and Varnish Co., Dept. CP, Box 389, Kansas City 41, Mo. When inquiring specify 7798 on form opposite last page.



# STAMINA

that takes heavy loading



THE STEM-WEDGE CONNECTION in Type 950 Hancock Steel Gate Valve won't bend or fracture even if corrosion prevents opening the valve. So strong is the connection that destructive "cheater" loading on the handwheel will first break the stem thread. The operator thus knows that the valve is still closed and can act to safeguard equipment and avoid shutdowns.

This ultra-strong stem-wedge connection, an exclusive Hancock design, overcomes a structural weakness widely recognized in other small gate valves. Its balanced design also places the "T" head slot in the wedge so that the stem can move freely, even though flow forces the wedge against the guides. It is a powerful example of the quality that makes Type 950 Hancock Steel Gate Valves perform better and longer in the severest services. Call your Industrial Supply Distributor for full details today.

## HANCOCK VALVES

A product of  
**MANNING, MAXWELL & MOORE, INC.**

Watertown 72, Massachusetts

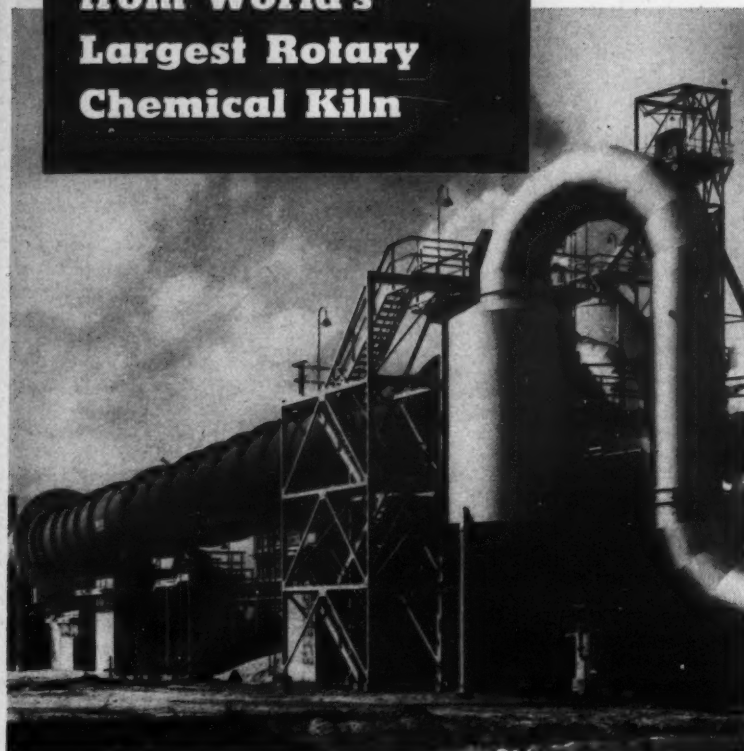
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario



When inquiring check 7799 opposite last page



## Peabody Scrubber Cleans Exhaust from World's Largest Rotary Chemical Kiln



In the new lithium hydroxide plant of American Lithium Chemicals, Incorporated, San Antonio, Texas, Peabody Scrubbers play a vital role by recovering valuable lithium ores from rotary kiln exhaust gases. This, the world's largest rotary chemical kiln, is served by two 11-foot Peabody units.

As in other Peabody Scrubber installations, effectiveness of recovery of fine ore particles is assured by the exclusive Peabody impingement plate design. Because of this special feature, gas and scrubbing liquid are brought into intimate contact and efficiencies of 99.8% are not uncommon in product recovery applications of this type.

Consult Peabody on any problem involving towers for scrubbing, cooling and absorbing.

### PEABODY ENGINEERING CORPORATION

232 MADISON AVENUE, NEW YORK 16, N. Y.

OFFICES IN PRINCIPAL CITIES

PEABODY LIMITED • LONDON, S.W. 1, ENGLAND

6-137

When inquiring check 7800 opposite last page

## NEW LITERATURE

### Details electronic control and recording

Summarizing the operating principles of electronic recording and controlling instruments of manufacturer, 64-page bulletin supplies details of the instrument and its use. Full specifications are listed for various recorders and automatic controllers. Sensing elements and special attachments, as resistance bulbs, magnetos, photocells, conductivity cells, frequency converters, and computing attachments are described.

Bul P1245-A is issued by The Bristol Company, Dept. CP, Waterbury 20, Conn. When inquiring specify 7801 on form opposite last page.

### Tumbling barrels reviewed in four-page catalog

Full line of replaceable tumbling barrels are described in illustrated four-page catalog. Barrels may be used as replacements on existing tumbling-finishing equipment or for "do-it-yourself" shops who wish to build their own tumbling machines.

"Replacement Barrels" is issued by Rampe Mfg. Co., Dept. CP, 14915 Woodworth Ave., Cleveland 10, Ohio. When inquiring specify 7802 opp. last page.

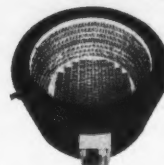
### Suggested formulations for paints

A compilation of suggested paint formulations for various vehicle systems is presented in collection of 17 data sheets. Systems discussed include polyvinyl acetate, high lead and zinc, alkyd semi-gloss, limed linseed, and latex.

"Suggested Formulations" is issued by Tamms Industries, Inc., Dept. CP, 228 N. LaSalle St., Chicago 1, Ill. When inquiring specify 7803 opp. last page.

### TRENT "Folded-and-Formed" HEATING UNIT

...for High Temperature Application  
where "Sheath-Type" Heaters Fail!



The only packaged "non-sheath" type electrical heating element competing directly with fuel fired equipment for temperatures up to 2000° F. Trent "Folded-and-Formed" Heaters now offer advantages not possible with any other type electrical heating unit!

**ADVANTAGES**—Compact, Space Saving Design • Longer Element Life • Maximum Radiating Surface Area • High Watt Density • High Temperature Uniformity to 2000°F • Low Thermal Inertia • High Dielectric Strength (600V) • Pin Point Control • All-welded Connections • Unity Power Factor • Direct Fired Element • Eliminates Heat Exchangers, Pipe Networks, etc. • Uniformity Equivalent to Liquid or Vapor Jackets • Economical Installation and Maintenance

**APPLICATIONS**—Kettles • Air and Duct Heating • Furnaces • Ovens • Reactors • Jackets and Autoclaves • Pipe Lines

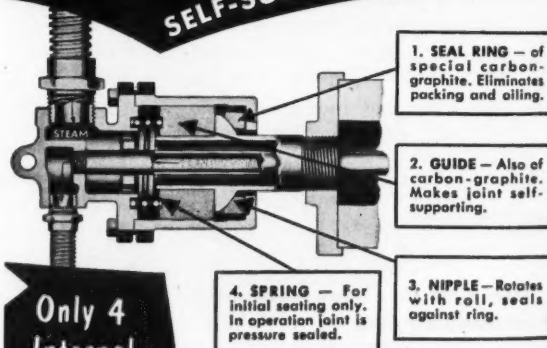
Before you design or install high temperature heated equipment, discuss your requirements with a Trent heating engineer. He'll show you how the outstanding features of Trent "Folded-and-Formed" Heating Units can mean greater efficiency and higher production for your application. Write for complete literature on Trent Kettles, Jackets, Ovens, Furnaces and Heating Elements.

Trent Representatives in  
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Coast to Coast

**TRENT INC.**  
Electrically Heated Industrial Equipment  
747 LIVERINGTON AVE. PHILA. 27, PA.  
Incorporated in Pennsylvania

When inquiring check 7804 opposite last page

## JOHNSON Rotary Pressure JOINT SELF-SUPPORTING TYPE



Only 4  
Internal  
Parts

1. SEAL RING — of special carbon-graphite. Eliminates packing and oiling.

2. GUIDE — Also of carbon-graphite. Makes joint self-supporting.

4. SPRING — For initial seating only. In operation joint is pressure sealed.

3. NIPPLE — Rotates with roll, seals against ring.

For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been adopted by dozens of machinery makers, and is finding new uses every day.

Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. Write for literature.

*The Johnson Corporation*

826 Wood St., Three Rivers, Mich.

When inquiring check 7805 opposite last page

CHEMICAL PROCESSING

## NEW LITERATURE

### Facts and figures on drum linings

Twenty-page booklet describes methods of lining drums with flexible plastics. Covering such topics as advantages, necessary thickness, methods of inserting and closing liners and other packaging items, and notes on various products and materials that are being handled with liners, booklet contains table of properties of various plastics. Similar table for laminates is shown.

"Facts and Figures on Plastic Packaging Products" is issued by Protective Lining Corp., Dept. CP, 22 Woodhull Street, Brooklyn 31, New York. When inquiring specify 7806 on form opposite last page.

### Latest data on fire-resistant curing agent for epoxies

Het Anhydride®, a chlorine-containing dibasic anhydride which is used as a hardener for epoxy resins; in paints, varnishes, and resins; and as a chemical intermediate, is subject of 21-page monograph. Reactions, uses, preparations, and properties are given. Recent data in high-temp flex properties and heat aging are included.

Bul No. 43 is issued by Hooker Electrochemical Co., Dept. CP, PO Box 344, Niagara Falls, N.Y. Specify 7807 opposite last page.

### Comprehensive catalog on stainless and alloys

Corrosion-resistant alloys and stainless steels are covered in detail in 102-page catalog. Corrosion data, chemical compositions, mechanical properties, heat resistance, and impact and abrasion resistance of a variety of metals are covered.

Catalog 175-A is issued by Electric Steel Foundry Company, Dept. CP, 2141 N.W. 25th Ave., Portland 10, Oregon. When inquiring reader may simply specify 7808 on form opposite last page.

### Gives information, formulas of chemical specialties

Eight-page report lists over 700 proprietary names for which chemical analyses are available. Eight manufacturing formulas are also listed.

Report is issued by Chemical Specialties Research Laboratories, Dept. CP, PO Box 33 Ansonia Station, New York 23, N.Y. When inquiring specify 7809 on form opposite last page.



## Inside story:

Valves may look alike on the surface. Their performance is another story. And the inside story of Powell Valves is that *every* Powell Valve has *Performance Verified*.

X-ray and gamma ray inspection—examining the very structure of the metal itself—are two of the many ways that Powell can make absolutely certain that Powell Valves will give *dependable* flow control.

Every part of every valve must pass rigid inspection. As a final step in manu-

facture, every Powell Valve is subjected to an *actual line test*. Because of Powell's pains-taking quality control, valve repair is cut to the minimum and plant shut down through valve failure is substantially reduced. Records from refineries, power and industrial plants the world over prove it.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our *COMPLETE quality line* which has *PERFORMANCE VERIFIED*.

The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR



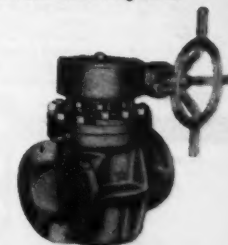
FIG. 2309—Flush Bottom Tank Valve for 150 Pounds W. P. Disc Opens Into Tank.



FIG. 2453G—Stainless Steel O. S. & Y. Gate Valve for 150 Pounds W. P.



FIG. 3059G—300-Pound Steel Flanged End Lubricated Plug Valve.



# POWELL VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

When inquiring check 7810 opposite last page



# Only CEILCOTE OFFERS THIS COMPLETE CORROSION PROOFING SERVICE!



Tank linings



Drain trenches



Floors and walls

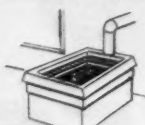


Pump bases



Write to CEILCOTE today... ask for Catalog G-201... and get complete information of materials and services.

Fiberglass reinforced



Polycarbonate ducts and hoods

● Regardless of the type of chemical attack that is costing you money and valuable time... CEILCOTE is prepared to supply materials and coatings that end your troubles.

CEILCOTE offers more than 30 years of unmatched experience and know-how. In addition... CEILCOTE engineers have developed a wide range of corrosion-proof linings, bonding cements, bricks, flooring materials and protective coatings... materials that can be used separately or in combination... materials that will lick your corrosion problems.

CEILCOTE engineers are prepared to evaluate and solve your corrosion problems. They are prepared to recommend materials required as well as supervise or handle in entirety your complete installation.



THE CEILCOTE CO., Inc.

4834 RIDGE ROAD • CLEVELAND 9, OHIO

When inquiring check 7811 opposite last page

## NEW LITERATURE

### Describes leak detector for halogen vapors

In addition to illustrating a halogen leak detector, bulletin of 40 pages also describes other instruments for test purposes. Leak detector shown will show presence of 1/100 of an ounce of halogen vapor per year. Additional instruments covered are for color, insulation, and radiation monitoring and measurement.

Bul GEC-1016 is issued by General Electric Company, Dept. CP, One River Rd., Schenectady 5, N.Y. When inquiring specify 7812 on form opposite last page.

### All about aluminum belt conveyor

Four-page bulletin, printed in two colors, gives detailed information on construction advantages of power belt conveyor for general uses. Fully illustrated, booklet explains how belt run-off is controlled and how belt tension is adjusted. Complete specifications, including data on frame construction, dimensions, weights and available sizes and power, are included.

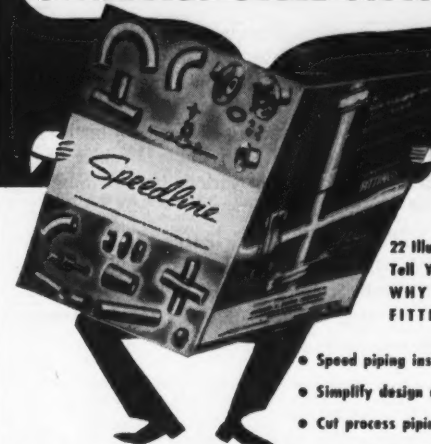
Bul 600 is issued by the A. B. Farquhar Division, The Oliver Corporation, Dept. CP, 106 N. Duke St., York, Pa. When inquiring specify 7813 on form opposite last page.

### Polyethylene pump feature of catalog

Illustrated 16-page laboratory catalog describes ovens, mixers, carts, chairs, stools, polyethylene labware. Feature of catalog is an all-polyethylene centrifugal pump for the laboratory.

"Lab-Oratory" is issued by Schaar & Company, Dept. CP, 754 W. Lexington St., Chicago 7, Ill. When inquiring specify 7814 on form opposite last page.

## LEARN ABOUT *Speedline* STAINLESS STEEL FITTINGS



22 Illustrated Pages  
Tell You HOW and  
WHY SPEEDLINE  
FITTINGS

- Speed piping installation
- Simplify design and assembly
- Cut process piping costs!

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*Speedline* STAINLESS STEEL FITTINGS  
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When inquiring check 7815 opposite last page

## NEW POCKET CALCULATOR For Liquid Batch Mixing

### CAPACI-DIAL for PNEUMIX AGITATORS

Simply turn the pointer to the particular volume and consistency of your batch. The selector automatically tells the best size Pneumix Agitator to do your mixing.



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When inquiring check 7816 opposite last page

CHEMICAL PROCESSING

### Covers controls and equipment for storage tanks

Including a technical section on tank storage conservation, vapor recovery, and vapor balancing systems, general catalog describes tank equipment, gas control and safety devices, automatic gas control equipment, electronic remote liquid-level gaging and pulse code telemetering systems.

Data included in the technical section are API guide for tank venting and roof manholes, chemical resistance of materials, conversions, selection of corrosion-resistant materials. Catalog is about 175 pages and includes much information of value on operation of large tank farms or of single tanks.

Varec catalog P-7R is issued by the Vapor Recovery Systems Co., Dept. CP, 2820 N. Alameda St., Compton, Calif. When inquiring specify 7817 on form opposite last page.

### How to figure costs for plant trucks

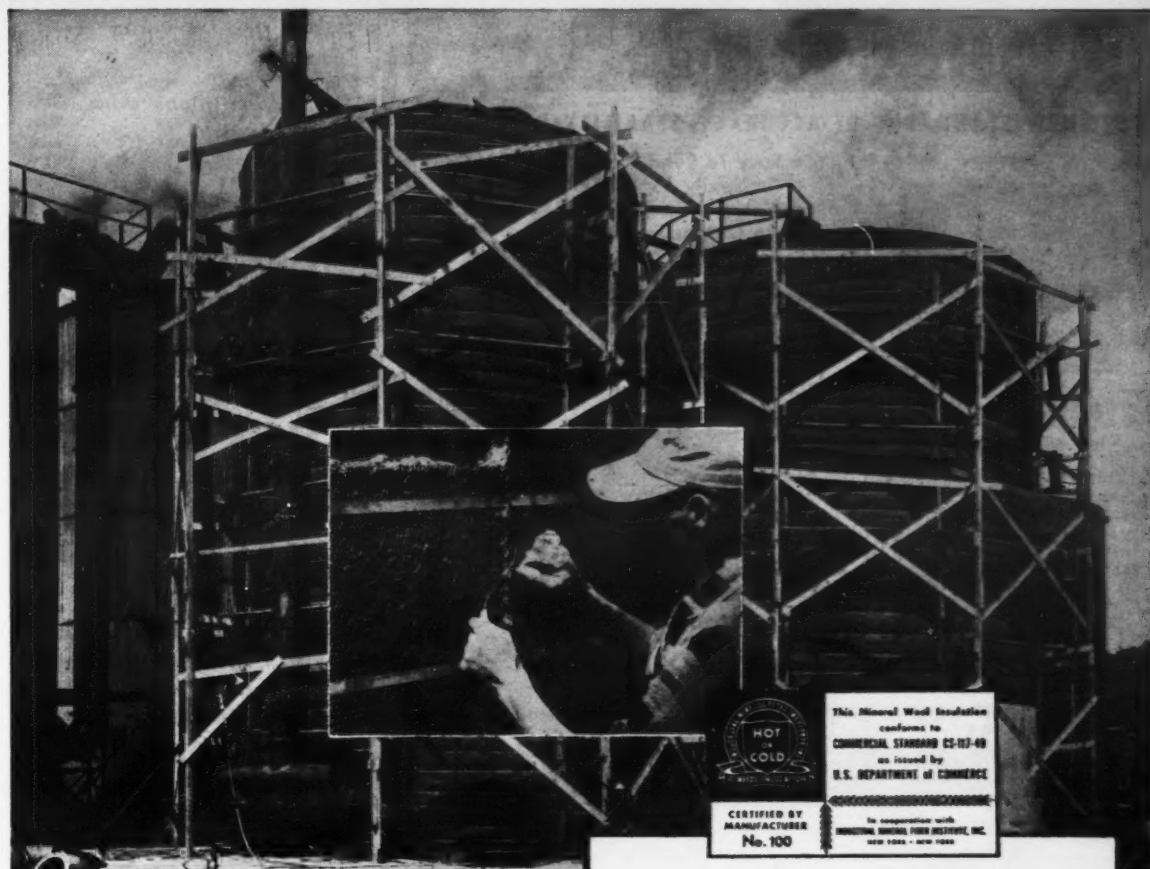
Four-page illustrated reprint sets forth practical methods for figuring costs of gas or electric industrial trucks in the plant.

"How to Figure Truck Costs" is issued by The Elwell-Parker Electric Co., Dept. CP, 4205 St. Clair Ave., Cleveland 3, Ohio. When inquiring specify 7818 on form which is located opposite last page.



"Anyone for hop-scotch?"

Thanks to Lester May, Jr., Union Oil Company of California, Rodeo, Calif.



This Mineral Wool Insulation conforms to  
COMMERCIAL STANDARD ES-117-49  
as issued by  
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the logical choice for  
insulating large areas

Easily

Quickly

Permanently

- Large, easy-to-handle B-H insulating Blankets are made of spun mineral wool fibers felted between different types of metal fabrics.
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- Resistant to moisture or corrosive fumes; will withstand normal vibration without breaking down.
- Fibers of one blanket interlock with adjacent blankets, completely enveloping equipment without breaks or joints; effective up to 1200° F.

See our catalog in Sweet's Plant Engineering File or write for a copy.

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### COMPLETE LINE OF BALDWIN-HILL INSULATING PRODUCTS

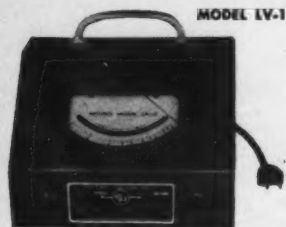
B-H Mono-Block	B-H Super Powerhouse Cement	B-H No. 100 Pipe Insulation
B-H Blanket	B-H No. 1 Insulating Cement	B-H 85% Magnesite Pipe Insulation
B-H Koldboard	B-H No. 52 Asbestos Cement	B-H Calcium Silicate Pipe Insulation
B-H Bond-Tite	B-H Spun Felt Insulation	B-H Mono-Kover Pipe Insulation
B-H Weatherall	B-H Fine-Fiber Felt Insulation	B-H Spun Mineral Wool Fill

When inquiring check 7819 opposite last page



# HASTINGS VACUUM GAUGES

SET NEW STANDARDS OF ACCURACY, STABILITY, RESPONSE



- Easy To Read Scales
- Unusually Long Life
- Matched Gauge Tubes
- No Outgassing Or System Contamination

**NEW MODEL LV-1.** Measures 0-100 micron Hg. Single meter; large 4" scale indicates vacuum directly without adjustments. Internal voltage regulator takes care of fluctuations in line voltage. Ideal for Industrial Installations. Also available in 0-1000 micron and 0 1-20 mm Hg. ranges.

## MODEL GV-3 VACUUM GAUGE

(Shown at right with optional 5-position switching attachment) Range from 0-1000 microns Hg. Manual current set and additional milliamper scale allow adjustment for use in presence of gases other than air, for leak detection, and for specialized laboratory use.



Evaluation by Users

**PROVES SUPERIORITY**

of Hastings Gauges

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When inquiring check 7820 opposite last page

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but the most practical ever made!

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styled and tailored by Worklon of  
100% ORLON® and 100% DYNEL

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FREE! Rush Worklon's new fully illustrated catalog of Orlon and Dynel Work Clothes.

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Attention of

Dept.

When inquiring check 7821 opposite last page

## NEW LITERATURE

**Gives descriptions, data on slide valves**

Four-page bulletin describes line of slide valves, designed particularly for use in pipeline transporting of solid materials suspended in liquids. Sheet describes a design of slide valve which provides straight-through flow in the open position with full pipe diameter. Details of construction are covered in text and illustrated, together with operating mechanisms for manual or power operation. Line diagrams with dimension tables give pertinent size data for various models.

Data Sheet Ub is issued by the Allen-Sherman-Hoff Company, Dept. CP, 259 E. Lancaster Avenue, Wynnewood, Pa. When inquiring specify 7822 opposite last page.

**Three protective coatings treated in folder**

Three corrosion-resistant coatings, one a styrene-butadiene type and the other two vinyl copolymer types, are discussed in detail in six-page bulletin. Properties of each are summarized in a two-page chart. Bul on No. 24, 33, and 40 coatings is issued by Nukem Products Corp., 111 Colgate Ave., Buffalo 20, N. Y. Specify 7823 opposite last page.

**Reference on chemistry of fatty acids**

A comprehensive and convenient reference work of 48 pages reviews composition of fats and oils, sources, and chemical makeup of fatty acids. Handling, test methods, and explanation of terms are presented.

"The Chemistry of Fatty Acids" is issued by Chemical Div., Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. When inquiring specify 7824 on form opposite last page.

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TOWER  
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**PORCELAIN**



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**KNOX**  
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**CROSS-PARTITION  
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- Uniform Quality
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**KNOX PORCELAIN CORP.**  
KNOXVILLE 1, TENNESSEE

When inquiring check 7825 opposite last page

## TRY DARCOVA PUMPCUPS

FOR

- Higher pump efficiency
- Lower pump maintenance



Cross-section of the conventional and 45° bevel type Pumpcups

IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumpcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumpcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.

Pumpcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Why not get all the facts? Send today for Pumpcup Bulletin No. 5503.

**DARLING VALVE & MANUFACTURING CO.**  
Williamsport 4, Pa.



TRADE MARK

**Pumpcups**

When inquiring check 7826 opposite last page

CHEMICAL PROCESSING

**Useful information on epoxies  
in chart form**

Chart, 11 x 21", offers basic information required in selection of epoxy resins for tooling, casting, laminating, and general coating purposes. Viscosities are given for basic resin and after hardener has been added. Physical properties are reported after twenty-four hour room temperature cure as well as after accelerated cure.

Bul EP-56-98 is issued by Furane Plastics, Inc., Dept. CP, 4516 Brazil St., Los Angeles 39, Calif. Specify 7827 opposite last page.

**Contains definitions  
of 101 atomic terms**

Illustrated with drawings and photographs, 22-page booklet lists the definition of 101 atomic terms. Said to be the first of its kind, the booklet has the terms arranged alphabetically. Included are such interesting slang terms like cutie-pie, pig, and coffin.

Booklet "101 Atomic Terms" is available on letterhead request to Esso Research and Engineering Co., Dept. CP, 15 W. 51st St., New York 19, N.Y.

**Ethylene imine  
chemistry**

An annotated bibliography of literature on ethylene imine, a versatile intermediate, is given in this 68-page book. Material from 1878 to 1954 is covered. Arranged in chronological order, the 224 entries are indexed by subject and author. An index of patent numbers is given.

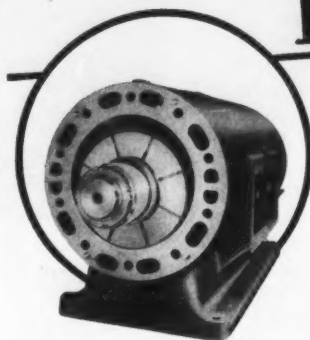
"Bibliography on Ethylene Imine Chemistry" is issued by Chemirad Corp., Dept. CP, PO Box 152, Port Washington, N.Y. When inquiring specify 7828 on form opposite last page.

**Adhesive selector**

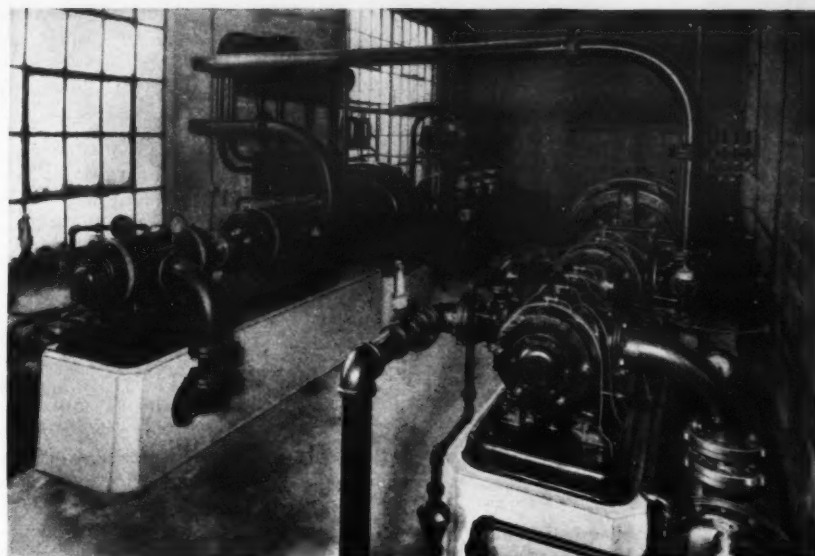
Chart, 14 x 22", gives recommendations for adhesives to use in bonding both similar and dissimilar materials. Relative strength of ultimate bond, method of application, and type of bonding technique to be used for twenty-four separate materials are given. These materials include rubber, paper, glass, and cotton.

"Adhesive Selector Chart" is available from Daubert Chemical Company, Dept. CP, 333 N. Michigan Ave., Chicago 1, Ill. When inquiring check 7829 on form opposite last page.

# Fuller pioneered



**the two-stage rotary  
compressor . . . for general industrial  
use . . . starting in 1930**

**INSTALLED 1930****STILL GOING STRONG**

Two Fuller Rotary Two-stage Compressors.  
Capacity each 740 c.f.m., 100-lb. pressure.

Fuller Company not only pioneered the rotary compressor for industrial use in this country, but it has always stressed the "spotting" of compressors. There's nothing new or startling about this principle . . . Fuller has advocated it ever since its first machines were put on the market in 1930 . . . applying each compressor to a specific job, with resultant overall plant economy, as well as power savings. Result: the adoption of this economical layout by thousands of users has proved to their satisfaction the soundness of such a program.

Fuller has built and sold thousands of Fuller Rotaries—

a large proportion of the two-stage type. And, when plant expansion is necessary, with a consequent demand for more air, additional Fullers are naturally installed.

Fuller engineers have never rested on their oars, but have continually worked to improve design and efficiency, until today, these machines are second to none for dependable air-production in industry.

We welcome the opportunity to present to you all the facts concerning Fuller Rotary Compressors, facts built on actual operational experience. For a complete description of Fuller Rotaries, write for Bulletin C-5A.



**FULLER COMPANY**  
136 Bridge St., Catasauqua, Penna.

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C-275  
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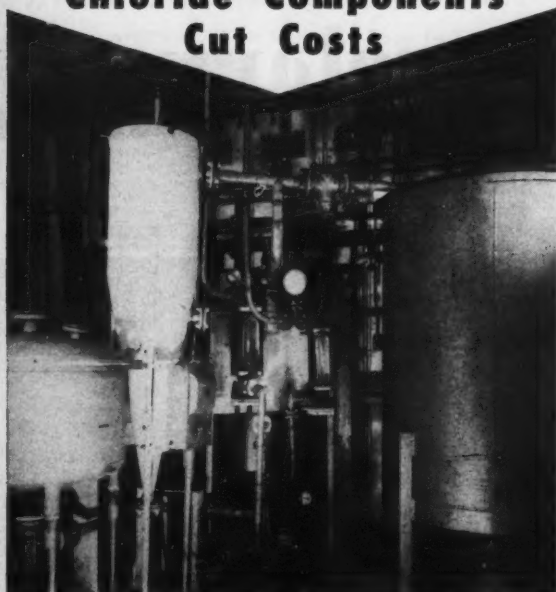
# Fuller

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

When inquiring check 7830 opposite last page



## AGILE Corrosion-Resistant Polyethylene And Polyvinyl Chloride Components Cut Costs



### Horizons, Inc. Benefits From Anti-Corrosive Agilide Tank, Pipe And Valves

For Horizons, Inc., leading independent research organization, the use of a corrosion-resistant polyvinyl chloride processing tank, plus flanged pipe and valves in a small pilot plant laboratory has made possible trouble free handling of highly corrosive acids, alkalis, solids and liquids. Original costs were less, maintenance is negligible, and there is no contamination.

Where corrosion and contamination are problems, polyethylene and polyvinyl chloride piping, valves, ventilating ducts or exhaust fans are sure to provide a most practical and economical answer.

You can benefit from these features:

- Lighter Weight
- Easier Installation
- Longer Service Life
- Lower Initial Cost, Negligible Maintenance
- Greater Rigidity and Strength

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Mailing Address, P. O. Box 168 • Bedford, O.

When inquiring check 7831 opposite last page

## NEW LITERATURE

### Describes complete line of roller conveyors

Two color 20-page catalog shows complete line of gravity-roller conveyors. Publication includes photos and descriptions of two-in-one unit that can be set low for small packages or turned over and set high for handling packages larger than conveyor width. In addition, catalog describes various specialty items — mobile tripod units, special curved sections, and inclined sections.

Bul 100 is issued by the Harry J. Ferguson Co., Dept. CP, Jenkintown, Pa. When inquiring specify 7832 opp. last page.

### Do-it-yourself shelving

Twelve-page illustrated cover catalog contains comprehensive discussion of assembly principle, showing how shelving may be erected as well as detailed survey of various models of open, closed, and ledge shelving available. In addition, all component parts and accessories necessary are shown along with several other types of special and high strength shelving.

Cat 706 is issued by The Frick-Gallagher Manufacturing Company, 110 S. Michigan Avenue, Wellston, Ohio. Specify 7833 opposite last page.

### Bul describes advantages of silicone coatings

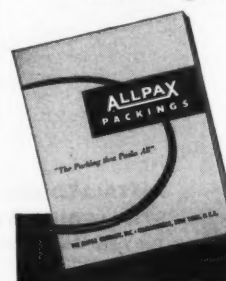
Design and maintenance advantages of silicone-based coatings are detailed in four-page bulletin. Coatings described have excellent resistance to heat, weathering, and corrosive atmospheres.

Bul 7-903 is issued by Dow Corning Corp., Dept. CP, Midland, Mich. When inquiring specify 7834 opp. last page.



## When Old Man Winter Starts to Blow

Engineers and maintenance men begin to check on maintenance items when they feel a nip in the air. These men know that now is the time to check their supply of handhole and manhole gaskets, packing hooks, sheet packing, asbestos tape, gasket cutters, etc. These men also know that whatever *your* packing need — Allpax has the answer.



### SEND FOR OUR NEW CATALOG TODAY!

See our complete line of packings, tools, and gasket materials. Distributors in principal cities.

### THE ALLPAX COMPANY

160 Jefferson Ave. • Mamaroneck, N. Y.

When inquiring check 7835 opposite last page



## How to select filter paper for commercial filtration!

This recently published brochure enumerates dozens of commercial products and processes and tells you the specific grades of E&D filter paper that are most widely used. In most cases, there is a choice of 2 or more grades. This valuable information is free for the asking. Write us for your copy. If your product or process is not included, we will be happy to recommend the best grade for you to try. Free samples for test runs will be made available to you.

You can rely on the experience of the only company in America exclusively engaged in the manufacture of filter papers for science and industry.



### THE EATON-DIKEMAN CO.

FILTERTOWN

MT. HOLLY SPRINGS, PENNA.

When inquiring check 7836 opposite last page

CHEMICAL PROCESSING

**Technical, economic factors  
of electron-beam radiation**

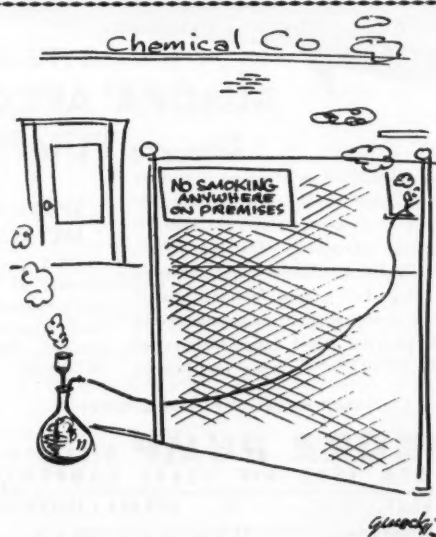
Use of electron accelerators in industrial processing is discussed in 34-page catalog. Technical and economic factors that must be considered in applying electron-beam radiation are presented. Photos, charts, and drawings are used to describe various models available. Space requirements, shielding, operation, and maintenance of electronic accelerators are also discussed.

Bul E is issued by High Voltage Engineering Corp., Dept. CP, 7 University Rd., Cambridge 38, Mass. When inquiring about manufacturer's literature, reader may simply check 7837 on form opposite last page.

**Properties, compatibilities, uses  
of low-mw polyethylenes**

Low molecular weight polyethylenes that are used as ingredients in combination with waxes or film-forming materials are the subject of 14-page mimeographed brochure. The features which make them attractive for use in coating paper, polishes, candles, electrical insulations, and rubber are brought out. Properties of the eight A-C grades and compatibilities are given.

Bul 116 is issued by Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N. Y. When inquiring reader may simply specify 7838 on the Reader Service slip located opposite last page.



# a chemical heating problem? ...call **GLAS-COL** ...specialists

*in heating equipment  
for the chemical industry*



Glas-Col Mantle  
for pipe and filter assembly



Glas-Col Mantle  
for gas phase reactor



Glas-Col Mantle  
for high-pressure reactor



Glas-Col Mantle  
for Cyclone Condenser

## GLAS-COL

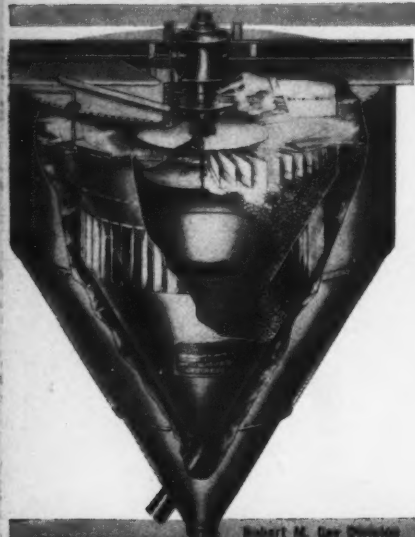
ELECTRIC HEATING MANTLES

It's difficult to stump Glas-Col on a chemical heating problem. For additional information, contact Glas-Col Apparatus Company, Dept. CP, 711 Hulman Street, Terre Haute, Indiana.

When inquiring check 7839 opposite last page



**USING SCREEN SEPARATIONS?  
NOTHING CLASSIFIES AS  
PERFECTLY AS AIR**



**UNIVERSAL ROAD MACHINERY CO.**

117 Liberty St., New York 6, N. Y.

Factory and Laboratory Kingston, N. Y.  
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**GAYCO**

**CENTRIFUGAL  
AIR  
SEPARATORS**

Classify practically all  
dry fine materials

You get:

- CLOSER SEPARATIONS
- IMPROVED PRODUCTION  
— fines removed as they  
are made.
- NO UNDESIRABLE  
OVERSIZE.

RANGE 60 to 400 mesh.  
Timken bearings.  
Choice of Standard or  
Heavy-Duty Models.

Send now for Catalogue  
and Studies in separating  
of various materials.

When inquiring check 7840 opposite last page

**Wynn**



**Diaphragm Valves**

**UNRESTRICTED FLOW  
MINIMUM PRESSURE DROP  
MAXIMUM DIAPHRAGM LIFE**

- ★ No dam to trap fluids and suspended matter; self-draining.
- ★ Unrestricted Flow—minimum pressure drop.
- ★ Exclusive Diaphragm Design—minimum flexing—no danger of overclosure.
- ★ Widest range of lining, diaphragm and body materials.
- ★ Lower first cost.

For handling:—

Slurries, corrosive and abrasive suspensions, pulps, sludges, gases, sewage, latex, semi-fluid foods, water, acids, alkalis, and most hard-to-handle fluids.

Write today for PROOF of these statements—compare and you'll specify Wynn Straight Through Diaphragm Valves.

Send me bulletin and complete details on  
Wynn Straight Through Diaphragm Valves.

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Title or function: .....  
Company: .....  
Address: .....  
City: ..... State: .....



**STOCKDALE ENGINEERING COMPANY**

P. O. BOX 144, HADDONFIELD, N. J.

When inquiring check 7841 opposite last page

**NEW LITERATURE**

**Details information on  
pressure switch**

Describing industrial switch designed for a variety of controlled pressure and limit switch applications, data sheet lists features and points out applications.

Containing detailed photographs and schematics of installation, sheet lists pressure ranges, operating differentials, and electrical ratings.

Spec sheet S1011-1 is issued by Minneapolis-Honeywell Regulator Company, Dept. CP, Wayne & Windrim Aves., Philadelphia 44, Pa. When inquiring specify 7842 opposite last page.

**Concrete gunning rigs  
illustrated**

Complete details, specifications, and operating capacities for manufacturer's concrete gunning equipment are presented in 16-page, illustrated catalog. Typical applications are illustrated in more than 30 photographs. Process of air placing or "gunning" concrete is explained.

Form 156 is issued by Air Placement Equipment Co., Dept. CP, 1009-11 W. 24th St., Kansas City 8, Mo. When inquiring specify 7843 opp. last page.

**Gives uses and results  
of dust collector**

Typical applications of company's ultra-filtration dust collector are given in four-page illustrated folder. Brief case histories are presented to show results obtained using this equipment. Tables and line drawings are used to detail equipment's sizes, specifications, and capacities.

Bul 557-D is issued by Wheelabrator Corp., Dept. CP, 343 S. Byrkit St., Mishawaka, Ind. When inquiring specify 7844 on form opposite last page.



DO TOP-GRADE WORK  
WITH UNSKILLED LABOE  
•  
APPLIED COLD  
NO FIRE HAZARDS!

**RECONDITION  
YOUR ROOF**

**AT 50% SAVINGS!**

Last call this year for roof repairs! Tropical Cold-Process Roofkoter and your own unskilled labor gives you a top-grade reconditioned roof. Cut repair cost in half—get a long-lasting, "live" roof. Flexes with temperature changes. No cracking or drying out. Remember, 90% of leaky roofs can get added years of weather-tight life—the Tropical way!

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When inquiring check 7845 opposite last page

**NOW!** The handling of liquefied petroleum gases, refrigerants and other light non-viscous liquids is a CINCH!

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for  
BULLETIN  
1112A



**TYPE Z4  
AURORA® APCO  
Process PUMPS**

New and difficult applications in modern industry pose a challenge to pump designers. Aurora engineers have met this challenge completely with the APCO TYPE Z4 Process Pumps—which combine the ideal turbine-type features, special metals where required, single mechanical seal and other latest design features for SURE RESULTS. We invite your inquiry.

**SPECIAL  
METALS**

APCO'S are obtainable in any machineable alloy. Small amounts required. Result: ECONOMY.

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THE NEW YORK AIR BRAKE COMPANY

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INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

When inquiring check 7846 opposite last page

CHEMICAL PROCESSING

**Glass heat exchanger design manual**

Basic information on characteristics, design, and operation of Pyrex-brand modular shell and tube heat exchangers is presented in 16-page manual. Individual sections tell how to 1) select, 2) lay out, 3) engineer, 4) order heat exchange systems. Manual includes drawings, charts, and information on fluid constants, friction losses, surface area calculations, and thermal gradients.

Bul PE-33 is issued by Plant Equipment Sales, Corning Glass Works, Dept. CP, Corning, N.Y. Specify 7847 opposite last page.

**On corrosion-resistant plastics, cements, coatings, linings**

One outstanding feature of 16-page publication on corrosion-resistant rigid plastic fabrications, cements, coatings, and linings is the two-page data sheet in color showing the resistance of each product offered to a variety of corrosives. In other sections of the booklet properties and data on each material are given in detail.

Cat CC-3 is issued by The Atlas Mineral Products Co., Dept. CP, Mertztown, Pa. Specify 7848 opposite last page.

**Engineering selection tables for V-belt drives**

Multi-color tables for quick and easy selection of variable-speed drives are feature of 44-page engineering booklet. Engineering formulas for drive selection are included. Comprehensive coverage is given to design features, drive principles, horsepower ratings, and speed ranges.

Bul 20P50 is available from Allis-Chalmers Manufacturing Co., Dept. CP, 1151 S. 70th St., Milwaukee, Wis. When inquiring specify 7849 on form opposite last page.

**Bending many kinds of tubing discussed in catalog**

Mechanical benders for conduit and tubing of copper, steel, aluminum, brass, or any bendable material are described and illustrated in 14-page catalog. Additional tools for electricians, plumbers, and construction workers are also discussed.

Cat 35-E is issued by Greenlee Tool Co., Div of Greenlee Bros. & Co., Dept. CP, Rockford, Ill. Specify 7850 opposite last page.

# ACCELERATION

# COLLISION

# IMPACT

# IMPLOSION

## in a Gaulin Homogenizer makes many products better — more economically

A Gaulin Homogenizer does three very important things to a product — it shears, expands and explodes, agglomerates down to their ultimate particle size.

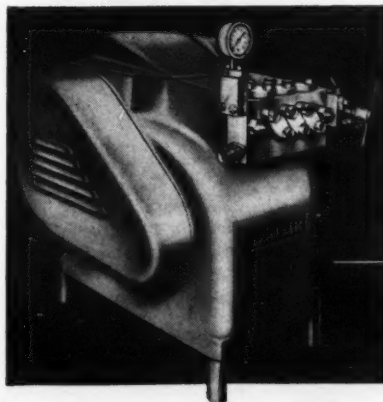
The results of this particle acceleration go far beyond just making products uniformly finer, faster, more economically. In most cases, the physical characteristics of a product are modified.

For example, here are some typical property changes. A Gaulin will *stop* separation. *Accent* taste, scent, and color. *Improve* texture, flow lubricity. *Speed* chemical reactions, and dispersion of ingredients. And *reduce* the amount of expensive materials needed.

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We'll be glad to show you just how a Gaulin can improve your product — and work with you toward solving any specific problems you may have. Write today for more information.

MANTON-GAULIN MFG. CO., INC., 55 Garden Street, Everett 49, Mass.



**GAULIN PILOT PLANT HOMOGENIZER**  
Ideal for experimental purposes, operation or process requiring up to 25 gallons per hour capacity. Handles quantities as small as one pint. Available on low rental basis.



**GAULIN TWO-STAGE COLLOID MILL**  
Stator is jacketed for cooling or heating. Gap setting adjustable for .001" to .045". Only 45 seconds clean-up required in changing colors. 12" head room. 12" x 17" floor area.

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## HOMOGENIZERS

WORLD'S LARGEST MANUFACTURER OF HOMOGENIZERS,  
TRIPLEX STAINLESS-STEEL HIGH PRESSURE PUMPS,  
AND COLLOID MILLS

**Some Typical Products Improved by Gaulin Homogenizers****PHARMACEUTICAL**

Emulsions and dispersions. Gaulins make them stable, uniformly finer. Permit accurate reproduceability.

**LIQUID STARCH**

Improves transparency, clarity, and stops separation, at lower cost than other methods.

**GREASE**

Improves lubricating value and stability. Increases service life.

**PIGMENT DISPERSIONS**

Provides continuous high capacity producing dispersions of ultimate particle size.

**COSMETIC EMULSION**

Gives smoother texture, longer shelf-life. Locks in perfume against evaporation.

**WAXES**

Makes accurate reproduceability possible. Provides uniform, stable emulsions and convenient viscosity control. Increases gloss.

When inquiring check 7851 opposite last page



Only

## OLIVER Diaphragm Pumps

satisfactorily handle  
heavy abrasive slurry at  
MANGANESE CHEMICALS CORP.



The Problem at Manganese Chemical Corp., Riverton, Minn., was to find a method of pumping abrasive slurry containing 60% solids. The material — underflow from the thickeners — had to be transferred to a still to be stripped of  $NH_3$  and  $CO_2$  in  $MnCO_3$  processes.

After considering a number of different pumps The Solution was provided with the installation of several Oliver Diaphragm Pumps . . . the only pumps that would satisfactorily handle the heavy slurry.

In operation, air pressure of 60-70 psi is applied to diaphragm at regular intervals to force slurry through pump. Each time air pressure is released by an electric timer, about 6 gallons of slurry is moved. A three-way solenoid valve controls the air. Rate of flow can be changed without stopping the operation.

If you have a slurry or liquid handling problem, the ODS Diaphragm Slurry Pump will do the job more efficiently with less maintenance cost. Write for Bulletin 309-R.

Dorr-Oliver engineers, specialists in pump applications, will gladly discuss your pumping problems. Ask for their assistance.

\*Trade Mark Reg. U. S. Pat. Off.



When inquiring check 7852 opposite last page

### NEW LITERATURE

#### Piping layout presented for jacketed piping

Information useful to those who specify, use, or purchase jacketed piping, valves, and fittings is presented in 26-page, spiral-bound catalog. Complete piping layouts, materials of construction, and tubing jump-overs are discussed.

Cat 356 is available from Parks-Cramer Company, Dept. CP, PO Box 444, Fitchburg 12, Mass. When inquiring specify 7853 on form opposite last page.

#### Roller bearings treated comprehensively

Complete specifications and principles of manufacturer's self-aligning roller bearings are treated in detail in 72-page catalog. Twelve pages are devoted to revised engineering references to aid engineers in determining correct bearings for various applications.

Cat 55 is available from Chain Belt Co., Dept. CP, Milwaukee 1, Wis. When inquiring specify 7854 on form opp. last page.



"Sexnical taction?"

Idea submitted by A. A. Schilling, Research and Development Department, Remington Arms Co., Inc., Bridgeport, Conn.

# FREE-

### EXPERT Engineering Assistance

Improve plant and office efficiency and safety through the use of proper audible and visual signals.

Have you neglected this economy because you are unfamiliar with the subject? If so, hesitate no longer!

Now, FEDERAL will send you FREE and without obligation their newest brochure entitled, "How to Select Signals." Complete with explanations, diagrams and graphic examples, this brochure will make you expert in selecting the proper FEDERAL equipment for your various signalling problems.

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**Write today** for your copy of Bulletin 100.



**FEDERAL SIGNAL**  
and **SIGNAL** Corporation

8761 S. State St., Chicago 19, Ill.

When inquiring check 7855 opposite last page

### FOR MAXIMUM SAFETY

all  
over  
your  
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use  
*Safety*  
**GRIP-STRUT**



the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive non-slip footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

#### Important Safety Features

- ★ Fire proof
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- ★ Easy to stand on
- ★ Cool in summer — warm in winter

#### Big Economy Features

- ★ For balconies — no extra light needed below — no extra heat.
- ★ No extra supports necessary — channels are integral part of the material
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- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."

**GRIP-STRUT division**  
**THE GLOBE COMPANY** • Manufacturers since 1914  
4006 S. PRINCETON AVE. • CHICAGO 9, ILL.

When inquiring check 7856 opposite last page

CHEMICAL PROCESSING

## 3 WAYS SPERRY CUSTOM FILTRATION ... HELPS YOU!

**Experience** - SPERRY OFFERS YOU the knowledge gained thru 88 years designing and constructing thousands of filter presses for hundreds of industries.

**Equipment** - SPERRY OFFERS YOU a complete selection of the finest filter presses, standard or special, all types and sizes of filter media, plus the widest selection of closing devices and other time-savers for all types of industrial filtration.

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Write for Free 44 page Catalog today

**D. R. SPERRY CO.**  
BATAVIA, ILLINOIS

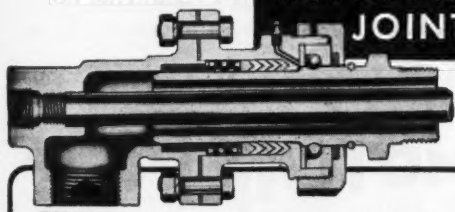
**Sales Representatives:**  
George S. Tenax, 808 Nepperton Avenue, Yonkers, New York  
Alldridge & McCabe, 847 E. 17th Ave., Denver 18, Colo.  
S. M. Pilchuck, 833 Merchants Exchange Building, San Francisco 4, Calif.  
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When inquiring check 7857 opposite last page

better  
temperature  
control  
... less  
maintenance

The Improved  
**BARCO**  
REVOLVING  
JOINT



**H**ERE is Barco's improved Type IBR Revolving Joint for supplying steam, water, oil, or other fluids to rolls, dryers, drums.

**LOW TORQUE!** Inherent low torque is little affected by pressure, speed or temperature - thanks to special ball bearing used in combination with self-lubricating graphite-carbon bearing and new low torque V-ring seals.

**LEAKPROOF AND LONG LIFE!** Note wide spacing between bearings. Insures close alignment and long life for self-adjusting, self-sealing packing.

**EASY SERVICING!** Internal parts readily accessible - usually without removing joint from roll. Sizes 1/4" to 2". Single flow or syphon styles. Steam: 150 p.s.i., 450°F., 500 RPM. Hydraulic: 200 p.s.i., 750 RPM.



Send for Bulletin 300  
**BARCO MANUFACTURING CO.**  
537K Hough Street, Barrington, Illinois

When inquiring check 7858 opposite last page

## NEW LITERATURE

**Gives specifications  
on control timers**

Catalog of 20 pages in two colors illustrates control timers. Other products described are differential transformer systems, automatic control systems, motorized valves, counters, and an electronic contactor. Bulletins are listed for additional information on products.

Condensed Catalog D-31 is issued by Automatic Temperature Control Co., Inc., Dept. CP, 5200 Pulaski Ave., Philadelphia 44, Pa. When inquiring specify 7859 on form opposite last page.

**Shows sample applicator  
for chromatography**

Describing a sample applicator for paper chromatography, 26-page catalog in two colors also lists other equipment useful in chromatography and electrophoresis. Accessories and chemicals are included in the listings. New catalog items are: tube setups, fraction collectors, chromatogram attachments for spectrophotometers.

Cat AC-56 is issued by Schaar and Company, Dept. CP, 754 Lexington Street, Chicago 7, Illinois. When inquiring specify 7860 opposite last page.

**Five panel meters  
covered in bul**

Printed in two colors, four-page catalog describes five panel meters with illustrations. Specifications and prices are included.

Vacuum tube voltmeters for AC and DC are described. Low level DC VTVM is also included.

Cat VM-106 is issued by Trio Laboratories, Inc., Dept. CP, 4025 Merrick Rd., Seaford, L.I., N. Y. When inquiring specify 7861 opp. last page.

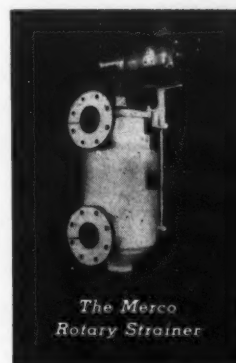
## Here are 4 reasons why you should use **MERCO** Centrifugal Separations

**GREATER  
PRODUCT YIELD**

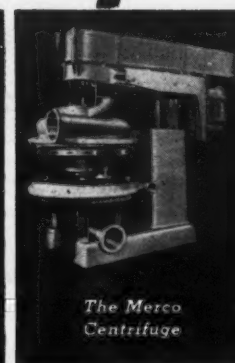
**REDUCED  
COSTS**

**CONTINUOUS  
SEPARATION**

**ADDED  
CLEANLINESS**



The Merco  
Rotary Strainer



The Merco  
Centrifuge



The Mercone  
Screening Centrifuge

Yes, from initial feed, to final separation, Merco Rotary and Bantam strainers, the Merco Centrifuge and the Mercone Screening Centrifuge will insure a more effective and economical separation of your product.

**At Initial Feed** Merco Bantam and Rotary strainers continuously and effectively screen-out oversize particles from feed to centrifuges and other equipment. And they are engineered to fit quickly and easily into existing process lines.

**At Final Separation** the Merco Centrifuge with unique return flow continuously handles, 24 hours a day, 7 days a week, the 5 basic separations:

- CONCENTRATION
- CLARIFICATION
- WASHING
- SOLUBLE RECOVERY
- CLASSIFICATION

And Now, the New Mercone Screening Centrifuge - designed to dewater crystals and fibers, to segregate or classify pulps, or to separate different types of solids. This completely continuous screen operates at a greater rate and at lower cost than any other known means.

Find out how Merco Separations can be applied to your operation. For more details on Merco Strainers, Merco Centrifuges and the Mercone Screening Centrifuges, just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

Any Merco Separation is a continuous separation.

Merco, Mercone - T.M. Reg. U.S. Pat. Off.



When inquiring check 7862 opposite last page





## Don't Let The Odor Imp Menace Your **SALES EFFORTS!**

**DEODALL® #1** has proved effective in commercial practice for masking solvent odors and the unpleasant scent of other petroleum products. *Deodall #1* gives high performance at *low cost* in a wide variety of applications. Why not send us a sample of your product for laboratory study and recommendations.

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Industrial Aromatics and Chemicals

330 West 42nd Street, New York 36, N. Y.

Branches: Philadelphia • Boston • Cincinnati • Detroit  
Chicago • Atlanta • Seattle • Los Angeles • Toronto

When inquiring check 7863 opposite last page

## Illustrated Bulletin Presents Newest Designs of Union Process Heating Equipment



Just published, illustrated Bulletin DV presents the full line of Union Process Heating Equipment for use in a tremendous variety of applications: high temperature molding; manufacturing paint, varnish, etc.; processing food products; plating tin; melting solders, asphalt; evaporating high boiling materials; petroleum refining . . . plus numerous others.

Designed for use with Dowtherm "A" and "E", Para-Cymene, Anisole, Aroclor #1248 and Heat Transfer Oil, Union Process Heating Equipment assures accurately controlled temperatures over a broad range at low pressure.

The complete story can be obtained by mailing the attached coupon to Union Iron Works, Erie, Pa.

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1555 Cascade Street, Erie, Pa.

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City ..... Zone ..... State .....

**UNION**

**It's Yours  
For The  
Asking**

When inquiring check 7864 opposite last page

## NEW LITERATURE

### Epoxy motor insulation that resists chemicals

Four-page bulletin describes a recently developed motor insulation, known as Epoxylite, which has shown exceptional resistance to chemical attack in field tests. Insulation on motors has withstood continual salt spray, repeated flooding, caustic, acids, carbon black, excessive vibration, high humidities, and wide temperature variations.

Bul on motor insulation is issued by The Epoxylite Corp., Dept. CP, 812 Truck Way, Montebello, Calif. Specify 7865 opposite last page.

### Management guide to vacuum forming

Vacuum forming — what it is and what can be done with it — is discussed in pocket-size 10-page booklet. Included are such things as costs, versatility, and descriptions of various models of machines. Photographs illustrate step-by-step procedures involved in process.

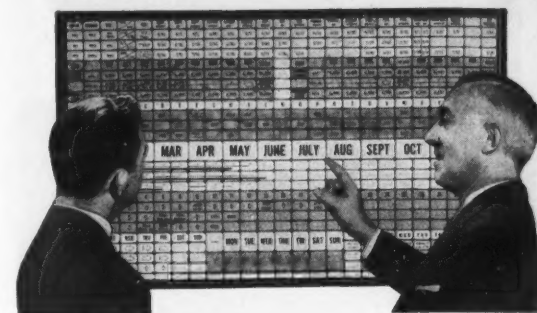
"Management Guide to Vacuum Forming" is issued by Vacuum Forming Corp., Dept. CP, 76 S. Bayles Ave., Port Washington, N. Y. When inquiring specify 7866 opposite last page.

### Shows thermistor types

Printed in two colors, 12-page illustrated brochure is a guide to products of five associated companies. Of particular interest are illustrations of types of thermistors and steps in their manufacture. Other products include accelerometers, electronic amplifiers, piezoelectric transducers, capacitors, electrical meters, and others.

"Gulton Industries" is issued by Gulton Industries, Inc., Dept. CP, Metuchen, New Jersey. Specify 7867 opposite last page.

## You Get Things Done Better By Seeing What's Happening



### BOARDMASTER VISUAL CONTROL

- ★ Gives Graphic Picture of Your Operations in Color.
- ★ Facts at a Glance-Saves Time and Prevents Errors.
- ★ A Simple, Flexible Tool-Easily Adapted to Your Needs.
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Complete Price **\$49<sup>50</sup>** Including Cards

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24-Page ILLUSTRATED BOOKLET AA-20  
Without Obligation

GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N. Y.

When inquiring check 7868 opposite last page

# 5 GPM

Whatever your liquid handling needs your problem can be solved by specifying an

## Ingersoll-Rand MOTOR PUMP

In this complete line are centrifugal Motorpumps from ¼ to 75 hp . . . capacities from 5 to 2800 gpm . . . heads to 650 feet!

Write for latest catalog with complete data needed to choose a Motorpump.



INGERSOLL-RAND 11 Broadway, New York 4, N. Y. 9-371

# to 2800

When inquiring check 7869 opposite last page

CHEMICAL PROCESSING

## NEW LITERATURE

### **Tells about corrosion-resistant tank lining service**

Eight-page publication describes manufacturer's service for lining tanks with hard rubber, soft rubber, neoprene, Koroseal, unplasticized PVC, and other materials. Bulletin illustrates the many different types of vessels, as well as autoclaves and other equipment that have been lined.

Bul on tank lining service is issued by Perma-Line Rubber Products Corp., Dept. CP, 1753 N. Winnebago Ave., Chicago 47, Ill. When inquiring specify 7870 on form opposite last page.

### **Brittle resins for adhesives, latex modification**

Six-page bulletin gives information on Penacolite brittle resins B-1A, B-16, and B-22, solid condensation products of resorcinol and formaldehyde, either with or without phenolic modification.

Tech bul C-6-230 is issued by Chemical Div., Koppers Co., Inc., Dept. CP, 1301 Koppers Bldg., Pittsburgh 19, Pa. When inquiring specify 7871 on form opposite last page.

### **Long-wearing grinding rods almost as hard as diamonds**

Synthetic grinding rods, having hardness approaching that of diamonds, are described in illustrated four-page bulletin. Rods are impervious to liquids and possess high resistance to all acids and chemicals. Bulletin contains case history of how one manufacturer reduced grinding time from 20 hours to 4 hours by switching grinding media.

"Diamonite Grinding Rods" is issued by Diamonite Products Division, U. S. Ceramic Tile Company, Dept. CP, Canton 2, Ohio. When inquiring specify 7872 on form opp. last page.

### **Describes aerosol fillers**

Containing descriptions, pictures, price lists and complete specifications for line of aerosol filling line components, data folder contains over a dozen separate brochures.

Brochures cover specific units as well as description of operating principles of equipment.

"Series 700 Electromatic" filler data folder is issued by Mojonner Dawson Co., Dept. CP, 9151 Fullerton Ave., Franklin Park, Ill. Specify 7873 on form opposite last page.

## Chemical Resistance . . . Low Maintenance . . . Positive Shut-Off

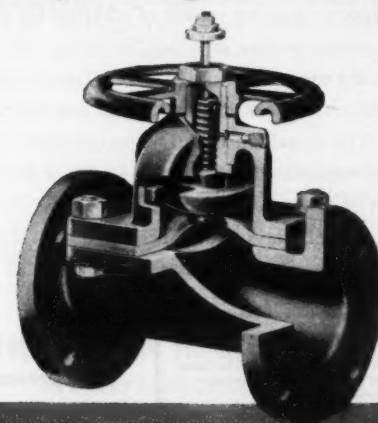


## You get all three with Hills-McCanna Diaphragm Valves

You can put an end to three common problems in the valving of corrosives and hard-to-handle fluids:

1. **End chemical attack**—Choice of 27 body materials and linings lets you match Hills-McCanna valves to the service. In addition, Hills-McCanna design isolates working parts from the flow by means of a diaphragm, available in a broad choice of materials.
2. **End frequent, troublesome maintenance**—There is no packing to replace in Hills-McCanna valves, no working parts contact the chemical fluid.
3. **End costly leakage**—Closure in Hills-McCanna valves is made by compressing a resilient diaphragm against a weir to effect a completely leakproof closure.

Put all these advantages to work in your plant. Ask your Hills-McCanna representative for full information or write for the Hills-McCanna valve catalog.



# HILLS-McCANNA

*Corrosion Specialists*  
*Since 1870*

## HILLS-McCANNA CO.

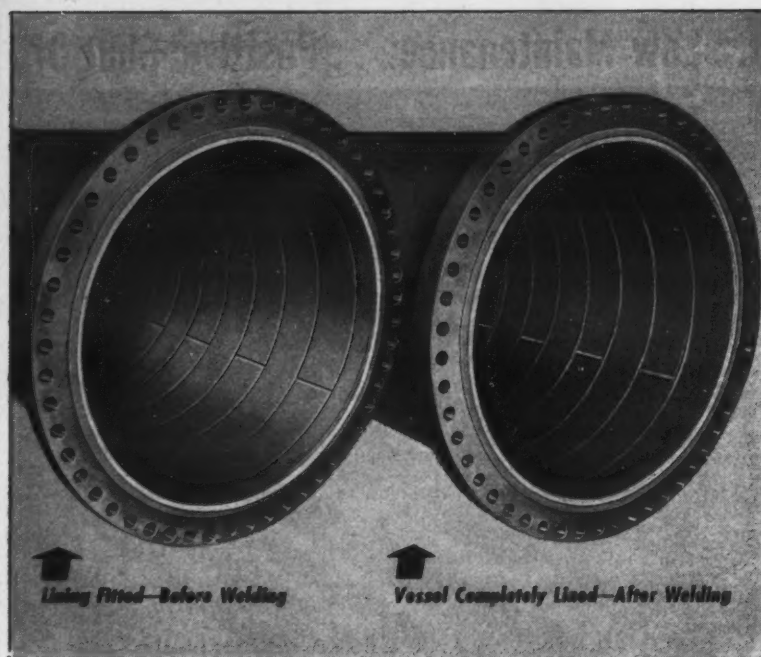
2370 W. Nelson St.

Chicago 18, Illinois

Manufacturers of: Saunders Patent Diaphragm Valves • Chemical Metering and Proportioning Pumps • Force Feed Lubricators • Light Alloy Castings

When inquiring check 7874 opposite last page





## For Special *Lined* Processing Vessels Come to STRUTHERS WELLS

LINING processing vessels of all kinds for chemical plants and refineries is another service in which Struthers Wells specializes. Years of engineering experience and extensive fabricating facilities enable us to build lined vessels that meet all codes and requirements.

The vessel illustrated is Inconel-lined, 36" I.D. x 43' high. Working pressure is 600 lbs. Lining is welded to outer wall to become an integral part of the processing vessel.

Vessels can be furnished lined with titanium, stainless steel, nickel, silver, hastelloy and other weldable metals to suit your applications.

### STRUTHERS WELLS PRODUCTS

**BOILER DIVISION**—BOILERS for Power and Heat ... High and Low Pressure ... Water Tube ... Fire Tube ... Package Units

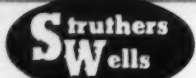
**PROCESSING EQUIPMENT DIVISION**—Crystallizers ... Direct Fired Heaters ... Evaporators ... Heat Exchangers ... Mixing and Blending Units ... Quick Opening Doors ... Special Carbon and Alloy Processing Vessels ... Synthesis Converters

**FORGE DIVISION**—Crankshafts ... Pressure Vessels ... Hydraulic Cylinders ... Shafting ... Straightening and Back-up Rolls

**MACHINERY DIVISION**—MACHINERY for Sheet and Structural Metal Forming ... Tangent Benders ... Folding Machines ... Roller Table and Tumble Die Bonding Machines ... Press Brakes ... Punching and Notching Machines ... Forming Dies

**Why not utilize this specialized experience on your equipment?**

## STRUTHERS WELLS CORP.



**TITUSVILLE, PA.**

PLANTS AT TITUSVILLE, PA.  
AND WARREN, PA.

Offices in Principal Cities

When inquiring check 7875 opposite last page

### NEW LITERATURE

#### **Chemical resistance and stability of silicon carbide**

Ten-page publication includes considerable material on the chemical resistance and stability of silicon carbide. Also of particular interest is the information given which tells how silicon carbide has been used in a number of typical applications involving corrosive conditions.

Carborundum Refractories, Vol. 1, No. 2 is issued by Refractories Division, The Carborundum Company, Dept. CP, Perth Amboy, N.J. When inquiring specify 7876 on form opposite last page.

#### **Surface-active agent data: both nonionic and anionic**

Specs, performance data, test methods, suggested formulations for detergents and cleaners, latex paints, agricultural concentrates, metal polishes, and specialties are given in 40-page booklet on Tergitol surface-active agents. Seven nonionics and four anionics are described.

Bul F-5900D is issued by Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 7877 on form opposite last page.

#### **Cleaning of edible-oil equipment subject of report**

Efficient procedures for cleaning processing towers, heat exchangers, preheaters, and other processing equipment to be used for edible oils is subject of five-page service report. In-place-circulation, soak-tank, and steam-detergent cleaning and sanitizing methods are explained. Recommendations are made for materials and equipment.

Report B-4677 is issued by Oakite Products, Inc., Dept. CP, 118F Rector St., New York 6, N.Y. Specify 7878 opposite last page.

#### **Saran-lined valves described in bul**

Photographs and descriptive material on valves which have been given excellent corrosion resistance by lining them with saran are given in four-page bulletin. Saran liner is firmly locked to valve and has a glass-like smoothness insuring minimum pressure drop.

Form SL9-1055 is issued by Saran Lined Pipe Co., Dept. CP, 2415 Burdette Ave., Ferndale 20, Mich. Specify 7879 opposite last page.

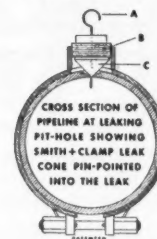
## Safer...Quicker Pipeline Repairs

### **WELD + ENDS Permits Welding a Pipeline While Pumping Through It**



A pipeline safety welding coupling for crude oil, gas, gasoline, asphalt, steam, chemical process and other pipelines. WELD + ENDS joins pipe securely so flow can be resumed immediately at full pressure. Welding can be performed while pipeline is in use days or weeks later. Sizes 2" to 36".

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Smith + Clamp shuts off more easily, quickly and safely than ordinary clamps. Use on high and low pressure gas, gasoline, crude oil, water, steam, air, chemical process and other pipelines. Sizes 1" to 30". Combine with WELDPLATE when pipe reinforcement is specified.

Write today for complete information on these latest developments in safer, quicker pipeline repairs: Weld + Ends and Smith + Clamp. Address Dept. A14

### **THE PIPE LINE DEVELOPMENT CO.**

5700 DETROIT AVE., CLEVELAND 2, OHIO

When inquiring check 7880 opposite last page

CHEMICAL PROCESSING

### Describes refrigerated angle laboratory centrifuge

General catalog of specialized laboratory equipment illustrates laboratory refrigerated angle centrifuge. Other equipment includes superspeed and angle centrifuges, ultra-microtomes, homogenizers, automatic pipets, electrophoresis and chromatography apparatus.

General Catalog "Specialized Laboratory Instruments" is issued by Ivan Sorvall, Inc., Dept. CP, P. O. Box 230, Norwalk, Conn. When inquiring check 7881 on form opposite last page.

### Bulletin lists specifications of tilting batch mixers

Full line of tilting batch mixers is described in four-page bulletin. Specifications for seven different size units are included. Units can be supplied with either Sigma or Z-type mixing blades.

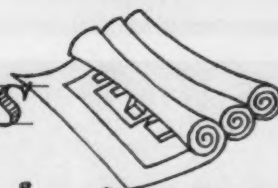
Bul B-12 is issued by Gruendler Crusher & Pulverizer Co., Dept. CP, 2915 N. Market, St. Louis 6, Mo. When inquiring specify 7882 on form opposite last page.



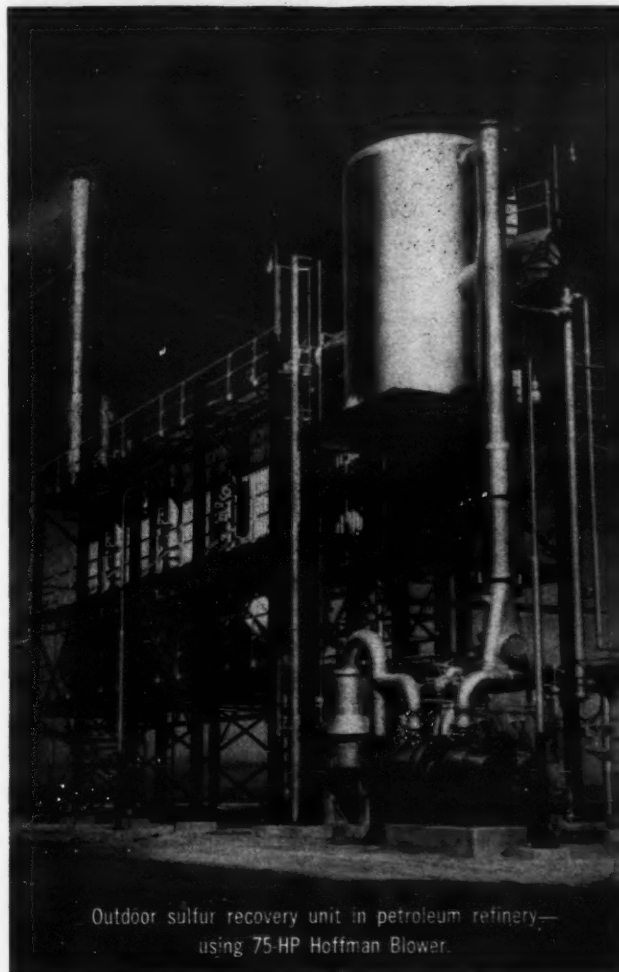
"Are you sure you added the phenolphthalein?"

Idea submitted by Ed Kolodny, American Cyanamid Company, Stamford, Conn.

# HOFFMAN'S ENGINEERED SYSTEMS designed to do the tough jobs in industry



WHERE THERE'S NEED FOR SMOOTH STEADY AIR SUPPLY—  
HOFFMAN CENTRIFUGAL COMPRESSORS GIVE LOW-COST, LONG-RUN SERVICE



Outdoor sulfur recovery unit in petroleum refinery—  
using 75-HP Hoffman Blower.

For process work, for drying, degassifying, or cooling—wherever engineers require air or gas moving under pressure, they are finding the ideal answer in Hoffman Multi-stage Blowers and Exhausters.

These air and gas movers are famous for their long-run, trouble-free, quiet, vibration-less performance. Available in a wide range of capacities, they work equally well as pressure or vacuum source—maintaining pressures up to 9 lbs. psi, and vacuum to 12 inches Hg. Power consumption is directly proportional to volume of gas moved. The dynamically balanced multiple-effect impeller assembly works without gears, valves, vanes, pistons, or other impacting parts—the basis for the remarkable long economical service life. The absence of internal lubricating or sealing fluids assures freedom from contamination.

With auxiliary equipment in Hoffman-engineered pneumatic installations, these compressors are building a new concept of efficient conveying—in salvage and recovery, in sanitation and clean-up, and in moving materials in powder and granular forms.

Technical bulletins describing the design and performance advantages of Hoffman Blowers and Exhausters, and pneumatic systems are available on request.

Please write:



**U.S. HOFFMAN MACHINERY CORP.**

**AIR APPLIANCE DIVISION**

DEPT. CP, 103 FOURTH AVENUE, NEW YORK 3, N. Y.

### AIR APPLIANCE DIVISION

Multistage Centrifugal Blowers  
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Continuous Metal Strip Driers  
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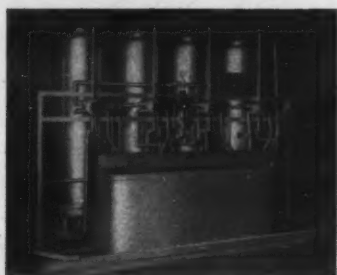
Machine Tool Coolant Clarifiers—  
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Conditioners, Filters, and Vaporizers  
Solvent Recovery Systems—  
Vacuum Stills and Filters

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Special Pneumatic Conveying Systems  
High Efficiency Centrifugal Separators  
Stationary and Portable Vacuum  
Cleaning Equipment  
Process Equipment  
Pneumatic Systems for Radioactive  
Materials

When inquiring check 7883 opposite last page





## When You Have A DEMINERALIZED WATER PROBLEM Barnstead Demineralizers and Barnstead Experience Can Help You Solve It

If you use water in your manufacturing operations it might pay you to find out how a Barnstead Demineralizer can help you maintain a consistent water purity. In countless processes—from food processing to electronics, from mirror silvering to atomic research,—better results are obtained, when demineralized water—free from harmful minerals is used. As a matter of record, thousands of manufacturers have already found out

that they save money, have practically no rejects, no spoiled batches or runs. With Barnstead produced demineralized water the cost is low—as little as 5¢ per 1000 gallons.

Whether you need demineralized water in laboratory quantities or for large production runs, you'll find in Barnstead's line of Bantams, Single-bed, Mixed-bed, 2-bed, and 4-bed Demineralizers the right equipment to suit your needs exactly.

### Some Barnstead Demineralizer Users

Radio Corp. of America • Remington-Rand • General Electric • Hercules Powder Co. • International Harvester Co. • Revlon • Sylvania Electronics Burlington Mills • Walter Reed Hospital • Ford Motor Co. • General Motors • Eastern Airlines

Write Today for Catalog #127  
and Bulletin #140

**Barnstead**  
STILL & DEMINERALIZER CO.  
ESTABLISHED 1911

66 Lanesville Terrace, Boston 31, Mass.  
Pure Water Specialists Since 1878

When inquiring check 7884 opposite last page



## What's A "New Solution"?

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem... explains the process used and gives details of how problem was solved... shows results secured.

Take a look at "New Solutions" articles in this issue—they might suggest a "solution" for some of your tough processing problems.

## NEW LITERATURE

### Reviews selection factors for fire hose

Describing manufacturer's line of industrial fire hose, a four-page data sheet reviews factors in selection of hose for safety and long life. Brochure offers operating data and specifications on 11 types of fire hose for industrial use. Also described is new chemical treatment which protects hose against mildew, rotting, moisture absorption, and freezing.

"Industrial Fire Hose" is issued by Industrial Products Division, B. F. Goodrich Co., Dept. CP, Akron, Ohio. When inquiring specify 7886 on form opposite last page.

### Improved magnetic separators described in bulletin

Non-electric magnetic drum separators with improved magnetic elements are described in four-page bulletin. Pull strength tests demonstrated 220% greater magnetic power than on previous models. Specification charts, diagrams, and installation photographs are also included.

Bul B54-1 is issued by Eriez Manufacturing Co., Dept. CP, Erie, Pa. When inquiring specify 7887 opposite last page.

### Small rotary pumps for chemicals

Four-page bulletin contains descriptive and engineering data on rotary displacement pump line for corrosive and hazardous fluids. Units described have volumes up to 10 cfm, heads to 100 psi, and operative temperatures up to 250°F. They are available in stainless steel, Monel, and Hastelloy C.

Bul AC 56 is issued by Eco Engineering Co., Dept. CP, 12 New York Ave., Newark, N. J. When inquiring specify 7888 on form opposite last page.

## CUSTOM FABRICATING DATA—Request New Brochure M-56

This information on plant facilities and services will be of value to purchasing, procurement and engineering personnel when planning the custom fabrication of...



## PROCESS TANKS

for the Chemical Processing  
Industry on the West Coast

Send blueprints for prompt quotation  
on your next job



**PUGET SOUND  
FABRICATORS, INC.**

3670 E. Marginal Way Seattle 4, Wash.

Craftsmen in steel plate and alloys up to 1"

When inquiring check 7889 opposite last page

## IMPORTANT SAFETY for your plant!



## Slip-resistant Tri-Lok and Tri-Forged Serrated grating and stair treads

Don't take chances in those plant areas where grease, oil or other conditions make floors slippery and dangerous! Play it safe with the non-skid, notched surface of Tri-Lok or Tri-Forged serrated grating and stair treads. Here is a walking surface that is hazard-proof and the ultimate in safety. To be sure you have com-

plete information on all Tri-Lok and Tri-Forged products, write today.

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National Distributors

When inquiring check 7890 opposite last page

CHEMICAL PROCESSING

## DOES *THIS* CONCERN *YOU?*

It does, indeed, if you have any unpleasant industrial processing or product by-odors to contend with. It concerns you because the practical advantages to be gained from effective control or neutralization of bad odors far outweighs, in most cases, the small cost involved. A representative of our Industrial Odorant Division will be glad to discuss with you the use of specially formulated odorants and the newer techniques of effective odor control. A word from you detailing the nature of your problem will help us to help you.

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*Brothers, Inc.*



PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES and \*STOCKS: Atlanta, Ga., Boston, Mass., \*Chicago, Ill., Cincinnati, O., \*Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., St. Louis, Mo., Montreal and \*Toronto, Canada and \*Mexico, D. F. FACTORY: Clifton, N. J.

When inquiring check 7891 opposite last page

## for hard-tough-dense concrete repairs . . .



## Non-Shrink EMBECO PRE-MIXED MORTAR

Outlasts and outwears plain cement-sand patches because . . .

- Does not shrink upon hardening.
- Bonds tightly to old concrete and mortar.
- Tough iron particles serve as reinforcement.
- Density resists water and oil penetration.
- Higher compressive and impact-resistant strength.
- Hard — contains no asphalt.

EMBECO PRE-MIXED MORTAR IS READY TO USE — you add only water.

Used to patch cracks, disintegrated and worn concrete floors, walks, steps, walls, etc.

Write for 4 page folder illustrating many applications.



DIVISION OF AMERICAN-MARIETTA COMPANY

**THE MASTER BUILDERS CO.**

CLEVELAND 3, OHIO

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When inquiring check 7892 opposite last page

SEPTEMBER 1956

## NEW LITERATURE

### Discusses N-substituted morpholine derivatives

N-methyl, N-ethyl, N-(3-aminopropyl) and N-phenyl morpholines are discussed in four-page folder. Use as catalysts, stabilizers, solvents, coupling agents, and textile processing agents are covered. A table of physical properties is included.

Bul F-8640 is issued by Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 7893 opposite last page.

### Reviews vacuum-drape forming machines

Illustrated 14-page catalog describes full line of vacuum and drape forming machines. Photographs are used to illustrate twelve construction features of the equipment.

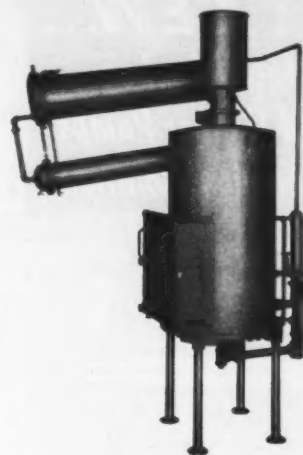
"Vacuum and Drape Forming Machines" is issued by Vacuum Forming Corp., Dept. CP, 76 S. Bayles Ave., Port Washington, L.I., N.Y. When inquiring specify 7894 opp. last page.



"Gerson is our electronics man"

Cartoonist Jean F. Mauck, Sr., is with Libby, McNeill & Libby, Blue Island, Ill.

## When You Have A DISTILLED WATER PROBLEM Barnstead Stills and Barnstead Experience Can Help You Solve It



Many products and processes today require water that is not only mineral free, but free of non-ionizable impurities including silica, organic matter, and bacteria. Barnstead — for over 75 years a leader and a pioneer in the manufacture of both laboratory and industrial stills, can give you impartial advice concerning complete water purification.

Whether you require a few gallons of distilled water per day or 1000 gallons per hour you can get the help you need from Barnstead — this pioneering pure water experience which has solved more than 70,000 tough purity problems all

Write for Catalog "G" today

**Barnstead**  
STILL & DEMINERALIZER CO.

66 Lanesville Terrace, Boston 31, Mass.  
Makers of Pure Water Equipment Since 1878

over the world is yours for the asking. There are many kinds of pure water problems — some require stills, some require demineralizers and others both. Barnstead can give you an impartial answer — for Barnstead makes both stills and demineralizers — for every pure water need.

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When inquiring check 7895 opposite last page

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# Wire Mesh

Specializing in the  
non-ferrous metals in counts to  
200 x 200 or 50 x 750 and  
widths up to 48" in all  
commercial weaves

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YEARS

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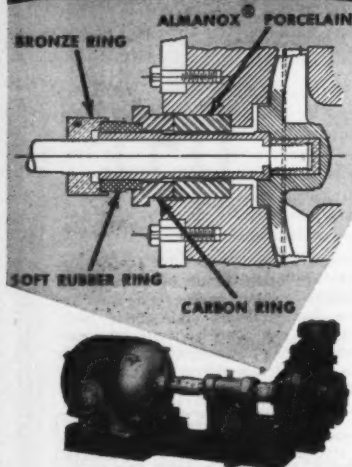
**THE C. O. JELLIFF  
MANUFACTURING CORP.**

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When inquiring check 7896 opposite last page



## It's NEW... Improved Seal on... Hard Rubber Pumps for Chemical Solutions



### How This Improved Seal Works

New mechanical seal on all Luzerne Pumps is made by using a revolving carbon ring against a stationary almanox® porcelain ring. This permits a rubber covering on the metal shaft and eliminates usual packing troubles due to friction and leaking of conventional packing.

© Frenchtown Porcelain Co. Trade Mark

### OTHER FEATURES

- Safely handles corrosive solutions
- Standardized parts for field repair
- Available in natural hard rubber or Buna-N synthetic rubber compounds to handle temperatures up to 225° F.

### SPECIFICATIONS

Style A — Open impeller pump — 140 gallons per minute at 90 foot head maximum.

Style B — Open or closed impeller pump — 115 gallons per minute at 68 foot head maximum.

2" — Suction 1½" — Discharge

Write for complete information or contact our sales representative nearest you.



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**L. A. RUBBER & ASBESTOS WORKS**  
Los Angeles, Calif.

When inquiring check 7897  
opposite last page

## NEW LITERATURE

### Describes dermatitis prevention

Describing silicone ointment which protects skin against water-dissolved material as well as organic solvents and oil-solvent-water-chemical mixtures, booklet describes uses and lists advantages.

Containing 77% silicone, ointment is unaffected by strong or weak acids, alkalis, oxidizing agents, detergents, protein solutions, and other material, whether in water or organic solution.

Silconex booklet is issued by Hygiene Research, Inc., Dept. CP, 684 Broadway, New York 12, N. Y. When inquiring specify 7898 on form opposite last page.

### Spiral and heavy-duty blenders illustrated in catalog

Blenders capable of mixing and blending pastes, powders, and liquids are discussed in illustrated eight-page catalog. Units feature solid-end construction, removable shaft, spiral expeller ring, and seamless welded radius corners. Specifications are included for eighteen sizes ranging from 5 to 515 cu ft capacity.

Blender catalog is issued by American Welded Tank & Machinery Corp., Dept. CP, 200 Liberty Ave., Mineola, L.I., N.Y. When inquiring specify 7899 on form opposite last page.

### Construction, operation of gearmotor shown in pamphlet

Photographs and diagrams are used to describe construction and operation of right-angle gearmotor for applications requiring 1-30 hp. Maintenance recommendations are included in four-page booklet.

Booklet B-6579 is issued by Westinghouse Electric Corp., Dept. CP, PO Box 2099, Pittsburgh 30, Pa. Specify 7900 opposite last page.

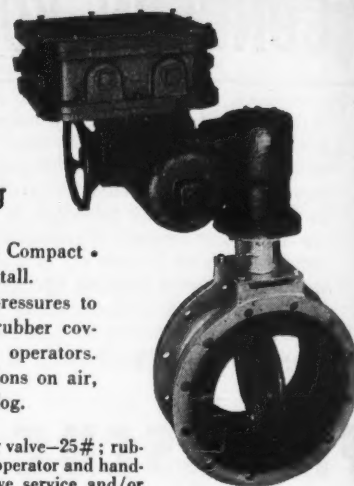
### Metallurgical carbons

Single-page data sheet discusses chemical and physical characteristics of manufacturer's metallurgical carbons, produced by high-temp carbonization of nut shells. Carbon is available in two types and in a number of grades. Given in tabular form are the specs of the carbons. Many applications are listed.

Bul J-35 is issued by Barnebey-Cheney Co., Cassady at 8th Ave., Columbus 19, Ohio. When inquiring check 7901 on form opp. last page.

## Meet Any Flow Conditions of Pressure • Temperature • Corrosion

### W. S. ROCKWELL Butterfly Valves for Tight Shutoff— Throttling—Regulating



Minimum pressure drop • Self-cleaning • Compact • Lighter weight • Less space • Easy to install.

Made in all sizes from 4" to 144"; pressures to 300 p.s.i. and higher, in any metal or rubber covering; with any manual or automatic operators. There's a wide choice for your applications on air, gases, liquids or solids. Write for Catalog.

W. S. Rockwell 10" butterfly valve—25#; rubber-lined; with Limitorque operator and hand-wheel. Suitable for corrosive service and/or drop-tight shut-off.



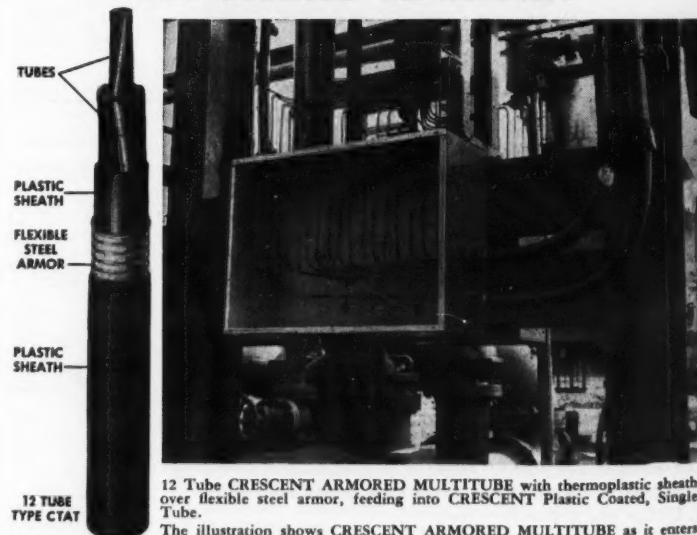
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FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

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Sales Representatives in Principal Cities

When inquiring check 7902 opposite last page

## CRESCENT ARMORED MULTITUBE on The Industrial Unit of the Bayway Refinery of ESSO STANDARD OIL COMPANY



12 TUBE  
TYPE CTAT

Send for  
NEW Bulletin  
No. 356-E

12 Tube CRESCENT ARMORED MULTITUBE with thermoplastic sheath over flexible steel armor, feeding into CRESCENT Plastic Coated, Single Tube.

The illustration shows CRESCENT ARMORED MULTITUBE as it enters the junction box from the right, connecting with individual tubes for relaying to the elaborate instrumentation system. Easy and economical to install, it is the solution to your corrosion problem. A complete system of tubing for permanent pneumatic and hydraulic instrument lines, with 2 to 19 copper tubes, ¼" G.D.

**CRESCENT INSULATED WIRE & CABLE CO.**  
TRENTON, N. J.

SEE EXHIBIT BOOTH NO. 611 INSTRUMENTS SHOW

When inquiring check 7903 opposite last page

CHEMICAL PROCESSING

**Gives facts on pyrethrin insecticide: background, production, outlook**

American imports of pyrethrum flowers will reach eight million pounds this year. The extract of these daisy-like flowers is used as an effective insecticide that is harmless to human and animal life. Summarized in 12-page pocket-size booklet are facts on the history, production, and outlook for this material. Five illustrations showing production in Africa are included.

"African Pyrethrum Facts for 1956" is issued by African Pyrethrum Development, Inc., Dept. CP, 65 Pine St., New York 5, N.Y. When inquiring specify 7904 on form opposite last page.

**Offers suggestions for developing wage incentive systems**

Bulletin examines place and use of money incentives as a stimulus to employee productivity, and outlines some practical suggestions for developing and maintaining a successful system. Book lists pitfalls to avoid and has checklist of points to be covered in formulating incentive policies and plans, as well as a bibliography.

To obtain "Wage Incentives" remit 25c direct to NAM Employee Relations Department, National Association of Manufacturers, 2 E. 48th St., New York 17, N.Y.

**Australian patent for polymerization of mono-olefins and diolefins**

Recent Australian patent gives details on process for polymerizing ethylene, propylene, diolefins, etc. Polyethylene produced has high molecular weight, melting point, and density. Patent consists of 91 pages.

To obtain Patent #6365/55 remit \$85.00 direct to Chemonomics, Inc., Dept. CP, 270 Park Ave., New York 17, N. Y.

**why is this magazine so "different"?**

Maybe you have wondered why this magazine, **CHEMICAL PROCESSING**, has such an unusual format?

Or why its articles are so terse, short, to-the-point?

The Editors explain how this benefits you—page 100.

# Corrosioneering News

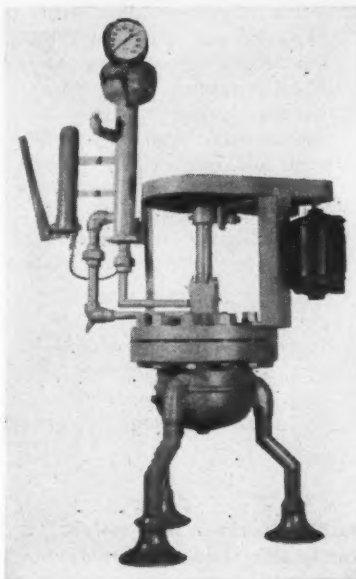
Quick facts about the services and equipment available to help you reduce corrosion and processing costs.



Published by The Pfaudler Co., Rochester, N.Y., U. S. A.

## ANNOUNCING PFAUDLER'S NEW FILM-TYPE EVAPORATOR

Now you can uncover areas of greater profit with this simple-to-operate still



### A new glassed steel autoclave

Handles reactions up to 750 psi

Your experiments with reactions involving high pressure and corrosive liquids have led to the development of a new, specially designed autoclave—now available to you at Pfaudler.

The new autoclave permits you to conduct reactions where internal pressures go as high as 750 psi with complete safety. Glassed steel construction prevents any undesired catalysis in the product from occurring. And you can study the reaction of highly corrosive liquids with the knowledge that no harm will come to the autoclave.

Since it is constructed of glassed carbon steel, the new autoclave gives you the corrosion resistance of glass and the structural strength necessary to withstand high pressures. Capacities are 1, 2, and 3 gallons.

You get a wide selection of agitation from the variable-speed drive—the two-blade impeller agitator is glassed steel, too. Provision has been made for a thermometer well and the nonmetallic rotary seal is equipped with pneumatic lubrication.

To find out more about these new autoclaves, write to us and ask for Bulletin 939.

Pfaudler has added an important new member to its growing family of products—a wiped-film evaporator for vacuum distillation.

It is a new improved evaporator which offers low-cost development opportunities to many industries e.g. chemical process, food, pharmaceutical, plastics, petroleum.

A floating carbon blade acted upon by centrifugal force cleanly wipes the peripheral evaporating surface to promote a very thin film and turbulence—creating higher heat transfer rates and faster evaporation.

Here are the benefits you get from using the Pfaudler evaporator:

1. IMPROVED HEAT TRANSFER—Very high heat transfer rates even for highly viscous products due to turbulence promoting carbon blades.
2. SHORT CONTACT TIME—No deterioration for heat sensitive materials.
3. CONSTANT UNIFORM FILM—The walls are wiped by actual contact of the carbon blades. This is the only positive means of inducing controlled turbulence and uniform film thickness. Fouling and solids-build-up are eliminated.
4. LOW-COST PROCESS—Because of the short contact time, high heat transfer rate and low power consumption of this evaporator, your operation can be more efficient and less costly.
5. SPACE SAVING—An internal condenser is built into the still eliminating an external condenser and interconnecting piping.
6. LOW MAINTENANCE RATE—Slow speed wiping minimizes wear. Closely machined tolerances between wall and wiper blades are not necessary because contact between the wiper and the wall is due to centrifugal force. Thermal expansion does not affect the operating efficiency of the wiper blades. No foot bearing is required.
7. LOW PRESSURE DROP—Pressure drops between evaporator and condenser as low as 1/10 mm Hg at one mm Hg operating pressure.

#### Two models available

Two Inch Laboratory Evaporator, complete with rotor motor, heating mantle, two 500-ml. receiver flasks, batch-type feed flask, degasser, Teflon wipers, 24/40 standard taper joints.

For 115 volt, 1 phase,  
50-60 cycle power ..... \$391.00  
For 250 volt, 1 phase,  
50 cycle power ..... \$397.00

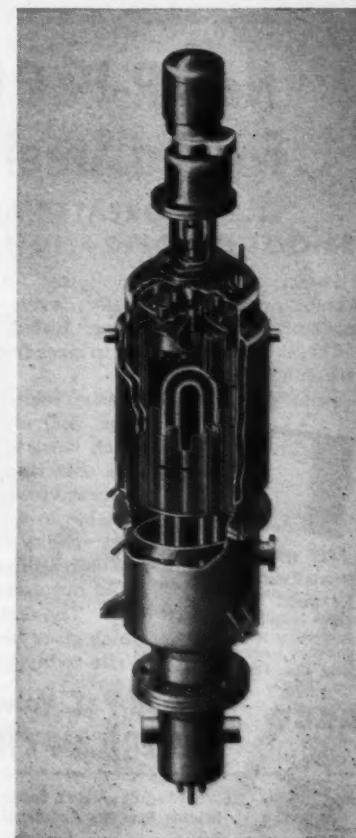
Twelve Inch Pilot Plant Evaporator, stainless steel, complete with 1/4 HP variable-speed rotor motor, 4 sq. ft. heat transfer surface in jacket, 6 sq. ft. heat transfer surface in internal condenser, vacuums to 0.1 mm or lower, temperatures up to 700 F., very high capacities. For 220 volt, 1 phase, 60 cycle power. (Prices on request.)

Units may be coupled for fractionation. The distributor acts to accelerate the distillate through the evaporator—residence time is less than one second.

In many installations of both the laboratory model and the Twelve Inch Pilot Plant unit, the versatility and high evaporation rate of this new evaporator have been proved. And it has been found that the quality of results from these small units can be dependably duplicated in production size units.

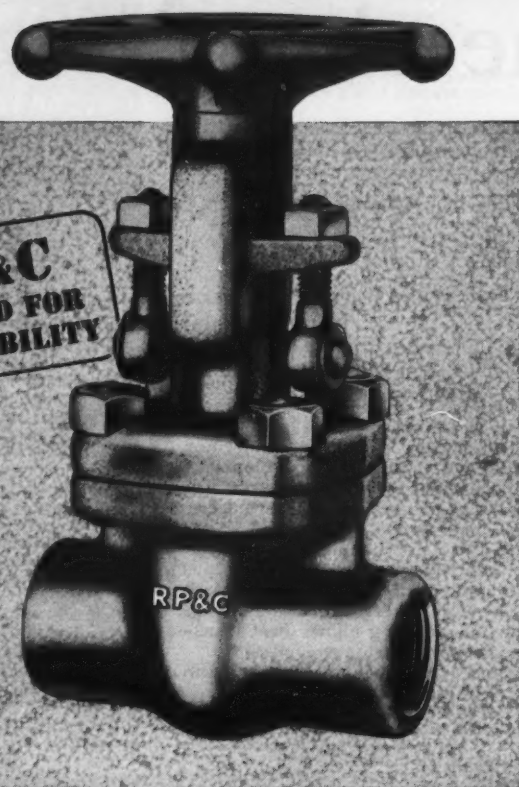
It's easy to test your distilland yourself with the laboratory model. Data you gather will enable you to uncover those areas of greater profit in your own operation. For your needs at that time, Pfaudler offers standard jacketed units in 24-, 36-, 48-, and 60-inch production size models.

Order the Pfaudler Two Inch Laboratory Evaporator now.



When inquiring check 7905 opposite last page





**R-P&C**  
DESIGNED FOR  
DEPENDABILITY

## New R-P&C F56 and F57 Forged Steel Gate Valves

... FOR GREATER ADJUSTABILITY,  
SMOOTHER OPERATION, LONGER PACKING LIFE

• These, and many other "plus" features, have been designed into these brand-new valves specially developed for power, petro-chemical, and process piping applications. Rated for 2000 PSI at 100° F or 800 PSI at 800° F, they are furnished in sizes from 1/4" to 2" with either screwed (F56) or welded (F57) ends.

Their advanced new design includes quality features like a new "tear-drop" 500 BHN heat treated stainless steel wedge which is mated with hard chrome plated stainless steel seat rings to effectively resist seizing, galling or abrasive wear. A Flexitallic spiral-wound gasket, reusable in normal service, assures a positive tight joint. Bulky flanges are eliminated for lower weight and streamlined appearance. Follower, eyebolt, gland nut and operating nut are all stainless steel.

The end result is a lighter, yet sturdier valve which gives better service. Get the complete story. Write today for Bulletin DH-525.

**R-P&C Valve Division**  
**AMERICAN CHAIN & CABLE**

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Houston, New York, Philadelphia, Pittsburgh, San Francisco,  
Bridgeport, Conn.

**R-P&C**  
valves



**FREE WALL CHART**  
"How to Protect Your Valves"

17" x 11" wall chart gives installation and operation pointers to protect valves, prolong life. Free on request.



### NEW LITERATURE

**Shows industrial darkroom  
photographic equipment**

Industrial darkroom equipment — stainless steel sinks, temperature regulators, print washers, color and black-and-white film developing equipment, and chemical mixers — and industrial photographic equipment — view cameras, lighting equipment, and copy stands — are described in this 32-page catalog. A complete system of automatic agitation for developing tanks, using nitrogen bursts is covered in detail.

"1956 Photographic Equipment" is issued by Calumet Manufacturing Co., Dept. CP, 6550 N. Clark St., Chicago 26, Ill. Check 7907 on form opposite last page.

**Radiant furnace well suited  
for heating heat-sensitives**

Radiant furnace for rapid, precision heating of heat-sensitive materials is described in two-page set of data sheets. Furnace consists of a light stainless steel shell surrounded by light-weight, high temperature insulating material. Processing vessel is suspended in furnace in such a manner that approximately 75% of heat applied to batch is by radiation from furnace walls.

Data sheets on radiant furnace are issued by Chemical Plants Division, Blaw-Knox Co., Dept. CP, Pittsburgh 30, Pa. Specify 7908 on form opposite last page.

### Engineering info on valves

Line of 2-, 3-, and 4-way solenoid valves is treated comprehensively in 32-page catalog. Engineering information, flow charts, operation and construction details, illustrations, and prices are included.

Cat 201 is available from Automatic Switch Co., Dept. CP, 391 Lakeside Ave., Orange, N.J. When inquiring specify 7909 on form opp. last page.

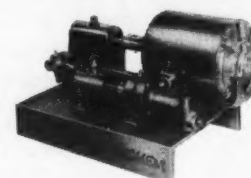
## INTRODUCING the

### "ORCHEM MITY-MITE" PROPORTIONING PUMP

Recommended particularly for low volume, boiler chemical feed applications. Excellent for many chemical process metering requirements.

Adjustable from 0 to 100% of capacity. No springs to retard self-cleaning of checks. Accessibility without breaking pipe connections.

SIMPLEX  
with  
1/2 H.P.  
motor



DUPLEX  
with  
1/2 H.P.  
motor

**\$15500**  
F.O.B.  
Phila.

**\$19800**  
F.O.B.  
Phila.

Plunger Diameter	RPM	Capacity		Maximum Pressure
		Simplex	Duplex	
7/16	70	3 GPH	6 GPH	610 PSI
5/8	70	6 GPH	12 GPH	325 PSI

WRITE FOR BULLETIN 8-56-1

### ORCHEM PUMPS, INC.

Controlled Volume Chemical Pumps

4434-36 SALMON STREET PHILADELPHIA 37, PENNA.

When inquiring check 7911 opposite last page

## Unichrome Drum Linings do double duty

### Protecting the Package

Remarkable resistance of Unichrome Drum Linings to acids, alkalis, salts and other chemicals provides dependable protection for steel containers. In addition, they have the necessary physical properties to maintain this protection despite rough handling. They offer proper adhesion and reverse impact resistance.



### Protecting the Contents

There are vinyl, phenolic, epoxy and plastisol types of Unichrome Drum Linings. These four types meet the needs of a broad range of chemically active products. They maintain a durable, continuous barrier to prevent contamination from the steel.

Send for Bulletin DL-2 which gives more data.



PLASTIC MATERIALS  
ORGANIC COATINGS  
TIN & TON COATINGS  
ORGANIC MATERIALS  
RADIATION-RESISTANT EQUIPMENT  
WELDING SUPPLIES  
METALS & ALLOYS  
HEAVY WELDING SCRAP



**METAL & THERMIT**  
CORPORATION

GENERAL OFFICES: RANWAY, NEW JERSEY

Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles  
In Canada: Metal & Thermit-United Chromium of Canada, Limited, Toronto

When inquiring check 7912 opposite last page

CHEMICAL PROCESSING

**Many reactions of kojic acid,  
its uses and analysis**

Kojic acid, a reactive multifunctional gamma pyrone which occurs as a product of fungal metabolism, forms stable water-insoluble metal chelates, reacts to form pyridones and pyridines, ethers and esters, condensation products, and substituted compounds. Loose-leaf 21-page bulletin describes these reactions, gives potential uses, analytical methods, and properties.

Data Sheet 502 is issued by Chas. Pfizer & Co., Inc., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y. Specify 7913 opposite last page.

**Marketing research service  
reviewed in 18-page book**

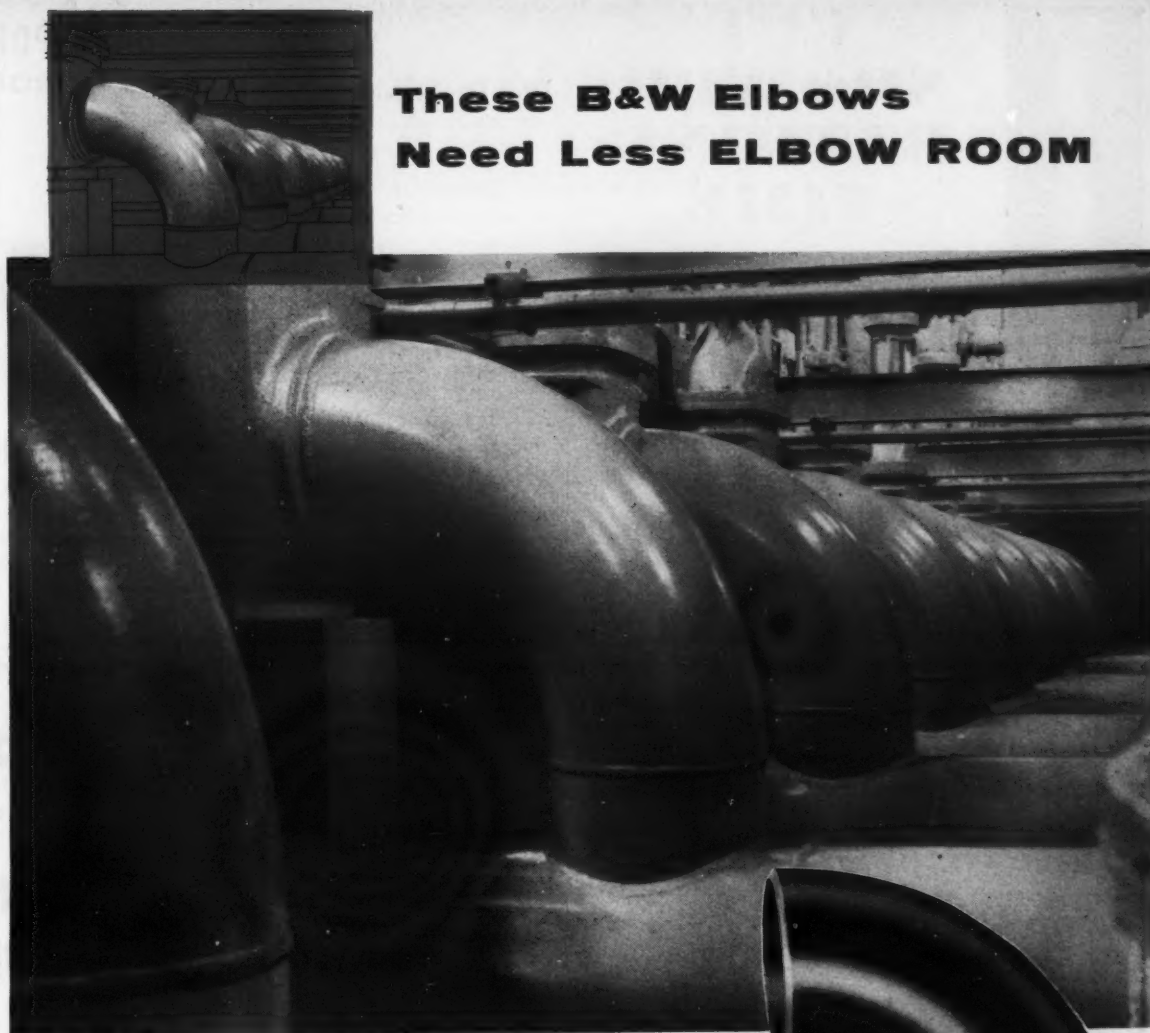
Nielsen Pharmaceutical Index service — why it was designed and how it operates — and how it can serve in appraising product success and marketing programs — is explained in 18-page book. Charts, tables, photographs, and text also explain how service can aid in the introduction and marketing of new products.

"Nielsen Pharmaceutical Index" is issued by A. C. Nielsen Co., 2101 Howard St., Chicago, Ill. Specify 7914 opposite last page.



"Hey fellas! . . . The oscillograph's really done it this time!"

Credit this cartoon to Tom Sarvay, New Product Development Division, Diamond Alkali Company Research Center.



**These B&W Elbows  
Need Less ELBOW ROOM**

ELBOW room was at a premium in this piping manifold. Fabricators chose B&W Fittings because they're easy to install, especially in a job like this which calls for "close-quarter" welding. Installation went ahead fast and without trouble, thanks to the accurate dimensions of the B&W Welding Ells used.

Maintenance, too, will be kept at a minimum because, with a sound weld, piping is permanent and leakproof. B&W Seamless Welding Fittings and Flanges are available in a complete range of grades, types, sizes and pipe schedules.

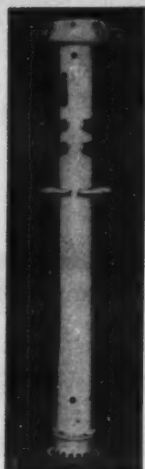
THE  
NATURAL  
SOURCE  
FOR ALLOY  
FITTINGS



**THE BABCOCK & WILCOX COMPANY**  
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT  
3839 WEST BURNHAM STREET • MILWAUKEE 46, WISCONSIN

Seamless welding fittings and flanges, seamless and welded tubular products — in carbon, alloy and stainless steels  
When inquiring check 7915 opposite last page





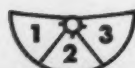
## CUT SHOWER BATHING TIME

• The Bradley Column at left is the main element used in Bradley Group Showers. It can be used alone with 5 shower heads, with and without stall partitions and curtains.

For each Column only 3 piping connections are required to serve 5 persons simultaneously, not 15 as for 5 conventional showers. Installation time and costs are cut.



5-STALL SHOWER



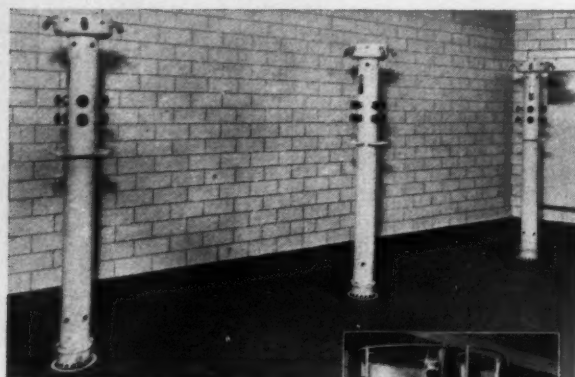
3-STALL SHOWER



2-STALL

All have same Column with or without partitions.

Make use of wasted corner space.



### TIME SAVED...

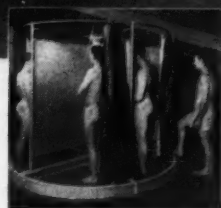
Your employees save time where adequate sanitary Bradley Showers are available and each bather has complete control of water temperature and flow... Made by the manufacturers of Bradley Washfountains, they are fast becoming the most widely used industrial Showers. For details see pages 24 to 26, new Catalog 5601.

**BRADLEY WASHFOUNTAIN CO.**  
2231 W. Michigan St., Milwaukee 1, Wis.

**BRADLEY**  
*multi-stall showers*

Distributed Through Plumbing Wholesalers

When inquiring check 7916 opposite last page



5-stall circular Shower with stall partitions and curtains.



Write for free copy of Catalog 5601

### NEW LITERATURE

#### Lists glass solvent jars for chromatography

Showing glass chromatography jars suitable for one dimensional chromatography technique, 36-page catalog in two colors also lists solvents useful with the method. Included in the catalog are also chromatocabs, drying ovens, fraction collectors, electrophoresis apparatus, a desalter, densitometers, tubes, and columns.

Cat No. C-465 is issued by Scientific Glass Apparatus Co., Inc., Dept. CP, 100 Lakewood Terrace, Bloomfield, N. J. When inquiring specify 7917 on form which is located opposite last page.

#### Comprehensive catalog on water stills

Booklet of 48 pages, in two colors, illustrates and describes manufacturer's line of water stills. Units pictured have capacities from 1/2 to 1000 gph. Descriptions of automatic and operating controls are also given. Pictures illustrate operation of water stills.

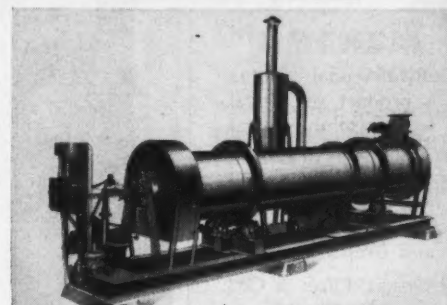
Catalog G is issued by Barnstead Still and Sterilizer Company, Dept. CP, 2 Lanesville Terrace, Boston 31, Mass. When inquiring specify 7918 on form located opposite last page.

#### Bonding of adhesives at room temperature

Application techniques, precautions, advantages, and limitations of bonding at room temperatures are discussed in eight-page reprint. Slant is towards epoxy-based compounds.

"Room Temperature Bonding" is available from Rubber & Asbestos Corp., Dept. CP, 225 Belleville Ave., Bloomfield, N.J. When inquiring specify 7919 on form which is located opposite last page.

### 2' x 3" dia. x 14' long DAVENPORT DIRECT FIRED ROTARY DRYER



**DAVENPORT**  
PRESSING - DRYING  
and  
COOLING Equipment  
Continuous DeWatering  
Presses  
ROTARY DRYERS  
Steam Tube, Hot Air  
and Direct Fire  
Atmospheric  
DRUM DRYERS  
ROTARY COOLERS  
Water and Air

### DRYING WELDING FLUX

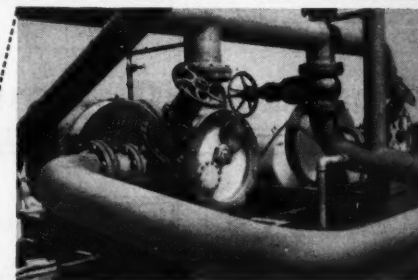
This "Davenport" package unit direct fired Rotary Dryer is fired with natural gas furnace with capacity of 75,000 to 600,000 BTU per hour.

This Dryer dries and removes all organic matter from Welding Flux efficiently and economically.

Let our engineers consult with you on your Pressing, Drying and Cooling problems or send for our catalog C. For quick reference consult your Chemical Engineering Catalog.

**davenport** MACHINE and  
DAVENPORT, IOWA U.S.A. FOUNDRY COMPANY  
When inquiring check 7920 opposite last page

### MILLION- GALLON WEEK- ENDS...



...are just part  
of the pumping job  
at this terminal



**LAKE** River Terminals, Inc., Argo, Illinois, is a 42,000,000 gallon barge terminal for petroleum and other products. A typical week-end for them includes unloading and complete stripping of four barges in 43 hours by two Viking pumps. Total capacity is 1,000,000 gallons. Besides those, the Ter-

mal has two Viking 6-inch pumps and a battery of five 2-inch Vikings. You see, Vikings are kept busy helping in the successful operation of the terminal. Vikings like tough pumping jobs like this. If you have a pumping problem, write for Bulletin 56S cc.



**VIKING PUMP COMPANY**

Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" pumps

See our catalog in Sweets

When inquiring check 7921 opposite last page

CHEMICAL PROCESSING

## The Venturesome Optimist

(Continued from page 7)

no such diffusion of judgment as marks our economy today. The average citizen had little to say as to the disposition of his income, for he could be certain that all he earned would go for the simple necessities required to maintain life — indeed Marx' theory of prices was based precisely on this assumption, for he reckoned the value of any commodity on its labor cost-at subsistence levels.

Today our problem is not only different but much more complex. The average American of our century, with half or more of his income available for things once regarded as luxuries, exercises a far more potent effect upon our national prosperity. Whether he spends his money or holds it for a rainy day is often dependent upon the economic weather reports to which he is exposed and whether he interprets them as fair and warmer or reads into them signs of a personal economic drought. Whatever the decision, our economy will be affected one way or the other.

### Long-term trend is most important

Much has been said recently about built-in stabilizers for our economy and of economic gyroscopes which will operate when the economy rises too rapidly or falls too steeply. I have no doubt that these ideas will be effective to some extent, and anything reasonable in that direction should surely be encouraged. My own feeling, however, is that it is the long-term trend rather than the immediate fluctuation that is most important. If businessmen keep their eyes fixed on the bright horizons and do not permit themselves to be stampeded into neglecting the future through fear of the present, there can be no more potent force to neutralize the effects of the immediate ups and downs in the economy.

There is no denying the spectacular upsurge of the American economy over a very long period of time. Many have speculated as to the reasons for our dynamic advance. Some have pointed to the factor of critical size with the feeling that, had our continent been a little larger or a little smaller, progress would have been impeded. Others have pointed to our material resources or to the strength and vigor of our people. I am not too impressed with these notions — many peoples have been strong and vigorous; many have had substantial resources; many have operated with a land mass roughly comparable to our own. Nor are genius and inventiveness unique to America. Our single great monopoly, if we may use so loose a term in so precise a sense, is the atmosphere of individual freedom and incentive which gives full rein to human ingenuity. Here is monopoly in truth, unmatched elsewhere on earth.

In our political testament we have a creation of  
(Please turn to next page)

## They're saving 4 ways by handling acids with Crane Plastic Piping

**THE CASE HISTORY**—Globe-Union Inc., leading storage battery builder, in its Milwaukee plant, might have decided plastic piping wasn't for them and let it go at that. Instead, they gave Crane plastic products a fair trial, and here are the results.

On hydrochloric acid lines to zinc-plating tanks, the metal pipe and fittings formerly used had to be replaced completely about every month. Corrosion was the cause.

With Crane polyethylene pipe and Crane plastic fittings in this same service, after more than 3 months there is no sign of deterioration and no apparent need of early replacement.

On battery test tanks, Crane

plastic piping, exposed to built-up sulphuric acid concentration, looks good as new after more than 4 months' service.

Savings with Crane plastic piping are adding up 4 ways. Plastic cancels the need for costlier metal pipe. It is installed in a fraction of the time it takes for metal pipe and fittings. It reduces installation to a one-man job with simple hand tools. The longer life of plastic is saving replacement, maintenance and housekeeping costs.

Proved in severest services, Crane plastic piping is giving Globe-Union equal satisfaction on many low-pressure air and water lines. Here freedom from sweating is another advantage of plastic.

Once you know the facts of quality-designed, quality-made Crane polyethylene pipe and Crane plastic insert fittings, you, too, will see many opportunities for saving with this modern piping. Call your local Crane Representative today, or write to address below.



Crane adapter makes plastic-to-metal joints easy

## CRANE PLASTIC PIPING

VALVES • FITTINGS • PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

When inquiring check 7922 opposite last page



# How the LINK-BELT Roto-Louvre dryer guards your product quality and cost control



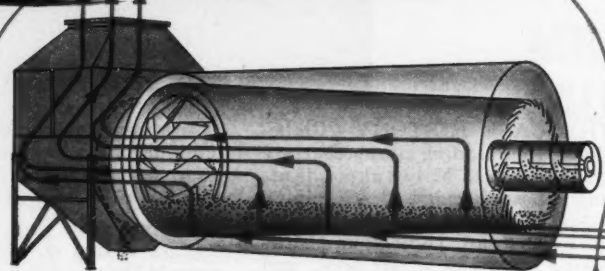
Roto-Louvre, shown in magnesium sulphate production, permits shorter retention time for material in drum . . . needs only half the floor space required by other designs.

*Provides gentle pre-drying, drying or cooling with laboratory accuracy*

**T**HE dangers of overheating or degradation of your product make the drying cycle a key element of your quality and cost control system. Duplicate the pre-forming of your laboratory operation with a Link-Belt Roto-Louvre dryer.

This compact, highly effective machine introduces dry, heated air through ever-changing channels reaching the entire surface of every particle. Stratification and segregation—resulting in an irregular, overdried or underdried product—are prevented.

For a complete report on Roto-Louvre's remarkable efficiency, send for Book 2511. Or, if you prefer to send us a sample of your material, we can work out drying, cooling or roasting procedures you can duplicate in your own plant . . . using the right dryer from the broad Link-Belt line.



**Common-sense design assures effective heat transfer**

Roto-Louvre has largest volume of air penetrating thin bed of material near feed end, where greatest evaporation must take place. As material moves forward and bed becomes thicker, smaller air passages reduce vol-

ume of air passing through bed, preventing overheating. Precise control of input air temperature, exhaust and conditions of material travel assures maximum heat transfer per cubic foot of air.

## LINK-BELT COMPANY

Prudential Plaza, Chicago 1, Ill.

Please send me 20-page Roto-Louvre Book 2511.

Name .....

Firm .....

Address .....

City..... Zn..... State.....



# LINK-BELT

DRYERS • COOLERS • ROASTERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World

14,235

When inquiring check 7923 opposite last page

## The Venturesome Optimist

(Continued from preceding page)

man's genius, perhaps in the highest expression ever achieved on earth. With it we undertook an experiment which cast off the rigid authority of the State, the Guilds, the social stagnation of our European antecedents, and all those other forces which sought to limit or abridge the free determination of the individual.

### Economic change without upheaval

Our experiment in government has succeeded beyond the wildest dreams of its early proponents. If we should need proof of a self-evident fact, we need only to reflect that we have weathered in our brief history as a nation panics and depressions, internal strife and external pressures of a severity sufficient to undermine virtually every government on earth save our own. It has served us through the greatest transitional change which can take place in the economic life of a nation—the transformation of a wholly agrarian state into the most important and most efficient workshop of the world.

It is sometimes hard for us to appreciate the speed and the staggering significance of this change. For thousands of years the principal source and wellspring of all wealth was the land. Wealth was measured in terms of land units and the landlord was not only a familiar figure but a political force. In contrast, the more potent producers of our national wealth today operate almost independently of the land, for factories require little in the way of acreage or fertility.

The change has been a rapid one. In the decade following 1870, over 20 percent of our national income came from agriculture and only 14 percent from manufacturing. Today the respective proportions are something like 7 percent from the land and 35 percent from our factories.

The point is that our system has been sufficiently flexible to accommodate this shift of direction, whereas in most nations the change, if accomplished at all, has brought social and political upheaval.

### Pioneers in the laboratory

This change has come through the massive thrust of our technology. Pioneering has turned from the land to the far more challenging exploration of the physical sciences. The frontier which confronted Daniel Boone when he crossed these very mountains a century and a half ago seemed limitless. We can now see that the physical frontier of 1800, great as were its potentialities, was but a patch of woods compared to those which today spread without limit over the agenda of our research laboratories.

Yet we must remember that pioneering in the

laboratory entails the same kind of risks, the same kind of disappointments, the same kind of frustrations as those faced by Boone and his party at the Cumberland Gap. It is slow and often fruitless plodding and, like the frontiersman, it seems that it must allow for failures and mistakes as well as for triumphs and discoveries. The conquest of the wilderness of science calls for the same faith, patience, and incentive as that reflected in our proudest moments of history.

I am sure the pioneer faced the peaks and valleys in an emotional as well as a geographical sense. I am sure that, on Boone's trek to Kentucky, there were days when he made less headway than he had the previous day, or indeed, when he was required to give up the hard-won position he had previously gained. There were certainly days when the wagon trains bogged down in the quicksand, when the day's march was interrupted or even thrown into retreat, or when the hazards ahead seemed more than human courage might endure.

But courage prevailed, on the frontier of the forest just as it must in the boundless horizon of our new quest. We will have our disappointments and our setbacks, I have no doubt. The economic road on which we travel will have its own quicksands and its own problems.

But let us make no mistakes about it — our destiny lies ahead. Which way the route will lead or what precisely lies over the hill we cannot say, any more so than Boone and his compatriots could say at the outset of their journey. But they were sure, and we are sure, that the way lies forward, that great progress will be made, and the shape of our achievements, when they are reckoned up a century hence, would astonish us if we could live to see them.

Our own industry will surely be a leader in this forward movement. We will, I know, contribute enormously to the general advance, both in what we demonstrate as true and what we demonstrate as false. It has been, you will recall, the eternal characteristic of research to humiliate and embarrass those who were unwary enough to describe what lay ahead. We should always remember that foresight has physical as well as historical limitations. We are sometimes even tempted to poke fun at the bad guessers of history, such as Mr. Osborne Reynolds, a very distinguished engineer who noted in the 1880's that electricity had little future because, a mile or so from its source, it would lose half its power. What would he say at the sight of those giant towers marching across the land to light a lamp in a window a thousand miles away! Or the unfortunate Dr. Newcomb, a most distinguished scientist himself, who was unwise enough to insist that man would never fly. His proclamation was made a scant few weeks before that December day in 1903 when the Wright brothers became as one with the birds.

(Please turn to next page)



**NOW...no knife edges  
to cut performance**

**NEW... Displacement-Type  
LIQUID LEVEL CONTROLLER**

Nobody thought it could be done: In one sweeping new approach Kieley & Mueller has eliminated the knife edge... biggest trouble spot in displacement principle instrumentation.

In place of knife edges which dull in time, the K&M Flexotrol introduces the *torque table*. It's perfectly centered always... requires less torque. It's free-turning... only 4" required. Yet it doesn't have a single spot for gunk to collect requiring maintenance, affecting accuracy. A torque tube is employed... still the controller is



For installation and operating convenience, the *Flexotrol* Controller is reversible and rotatable... but something more: optional mechanical indication, independent of the pneumatic system, is your final and positive check. Available with all control features including automatic reset.

actuated by a torque rod that does not twist. Both torque tube and torsion table legs are Inconel X... a special material resisting corrosion and fatigue alike. Five million cycles has shown no detrimental effect.

The full story is in Bulletin #56-1. Send for your copy.

**KIELEY & MUELLER, INCORPORATED**

**K&M**

64 Genung Street • Middletown, New York  
diaphragm control valves and regulators for over 75 years

When inquiring check 7924 opposite last page





# Proctor

## DRYING RANGES

for

### highest product uniformity!



**PRODUCT UNIFORMITY** is of utmost importance to every food processor, at all stages of processing. The Proctor continuous conveyor dryer installation shown above is located in a plant of one of the world's largest food manufacturers—typical of many in use in the food industry today. In this plant Proctor Dryers assure uniformity of color, taste, and high customer appeal—yields are greatly increased!

**WITH UNIFORMITY COMES PROFIT.** Efficient drying per pound of product can often mean more direct profit than an increased sales volume. Proctor equipment provides the control, flexibility and construction features *essential* to profitable drying performance. Write or phone today for complete information.

**PROCTOR & SCHWARTZ, INC.**

Philadelphia 20, Pa.



MANUFACTURERS OF INDUSTRIAL  
DRYING EQUIPMENT  
AND TEXTILE MACHINERY

**INCREASED YIELDS**

**GUARANTEED QUALITY OF PRODUCT**

**FLEXIBILITY**

**PROFITABLE OPERATION**

**OTHER PROCTOR DRYING EQUIPMENT FOR THE  
FOOD AND PROCESS INDUSTRIES**

TRAY DRYERS • TRUCK DRYERS  
PRE-FORMING FEEDS • SPRAY DRYERS

When inquiring check 7925 opposite last page

## The Venturesome Optimist

(Continued from preceding page)

But we should be sympathetic to such errors, for it is a fair guess that any of use, no matter how professional or how tempered our view on any subject, will be proved tomorrow to have been grossly wrong.

### A need for optimism

If we are wise, we will set our sights high. We will focus on the objective which lies ahead — the green and fruitful plateau, not the stony ground and the patches of hard going we must cross to reach it. There is no virtue of stagnation, nor is there safety or security to be found in standing still. I think, if we are to have the esteem and regard of succeeding generations, it would behoove us to place our bets on the side of optimism. Most of our country's progress has come through a spirit of boundless confidence and optimistic disregard of the consequences of failure.

There is hardly a successful venture in our history, industrial or national, against which excellent arguments, highly logical arguments, could not have been marshalled at the outset. Undoubtedly, sound reasons were advanced as to why the transcontinental railroad should not be built, why the Homestake Mine should not be opened, or why the settlements beyond the Ohio should never have been attempted. I can cite from my own experience the fact that there were extremely plausible pleadings advanced to the effect that the Du Pont Company should not enter the field of dyestuffs or the field of fundamental research or the field of synthetic textile manufacture.

Fortunately, it was the optimist that prevailed. Much of our progress, it must be said, has come about because dreams have triumphed over cautious reality; because the poetry has proved more persuasive than the prose.

I am inclined to think that such venturesome victories, with the covey in the bush proving more attractive than the assured bird-in-hand, typify at this point the history of America. I am quite certain that they typify, in a most exciting and hopeful way, the future of America.

A "different"

editorial

philosophy ...



... governs the content, format of **CHEMICAL PROCESSING**. There are good reasons for this "difference". It all boils down to the most profitable reading in the shortest time for the busy reader. Read what the Editors say about this on page 100.

CHEMICAL PROCESSING

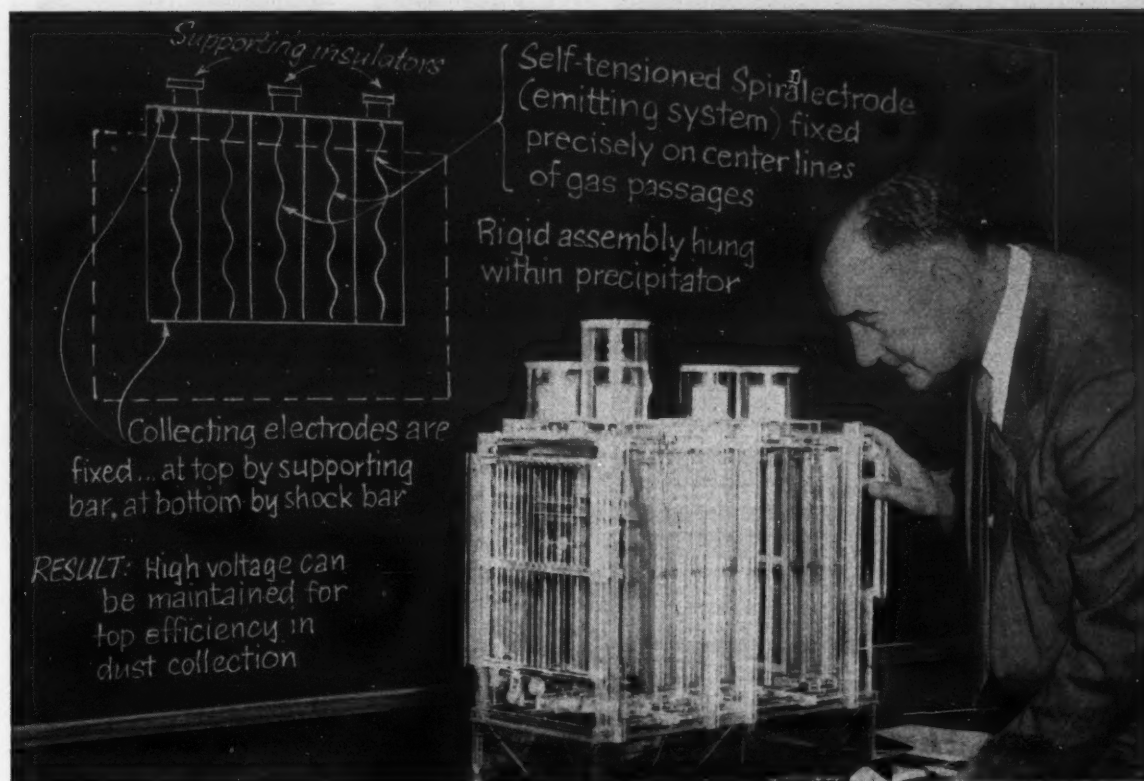
## Discussed in This Issue - - - PROCESSES, EQUIPMENT and MATERIALS



Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

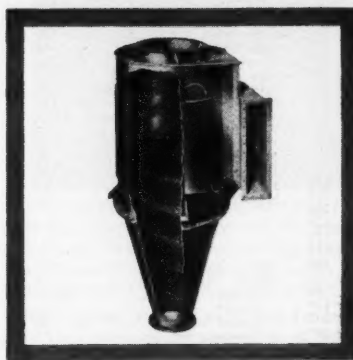
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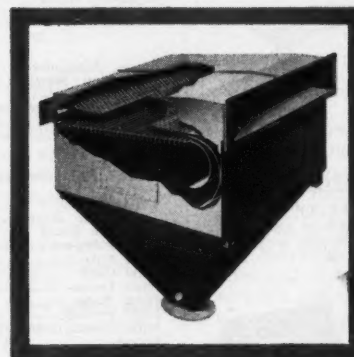


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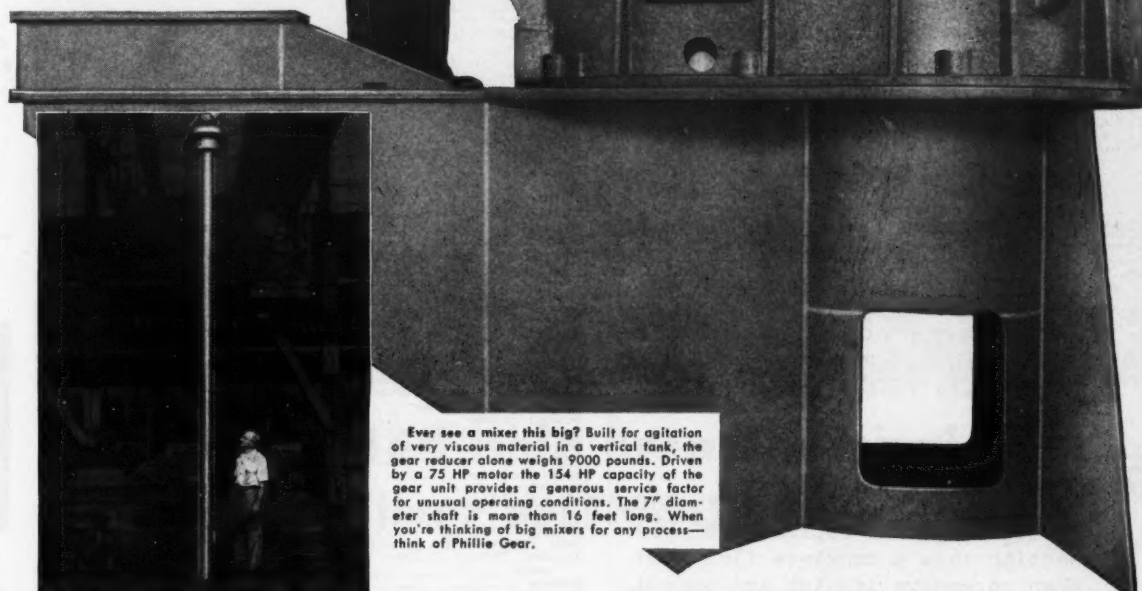
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FOR CHEMICAL ENGINEERS

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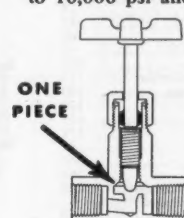


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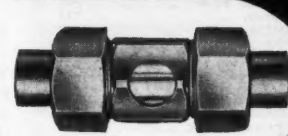
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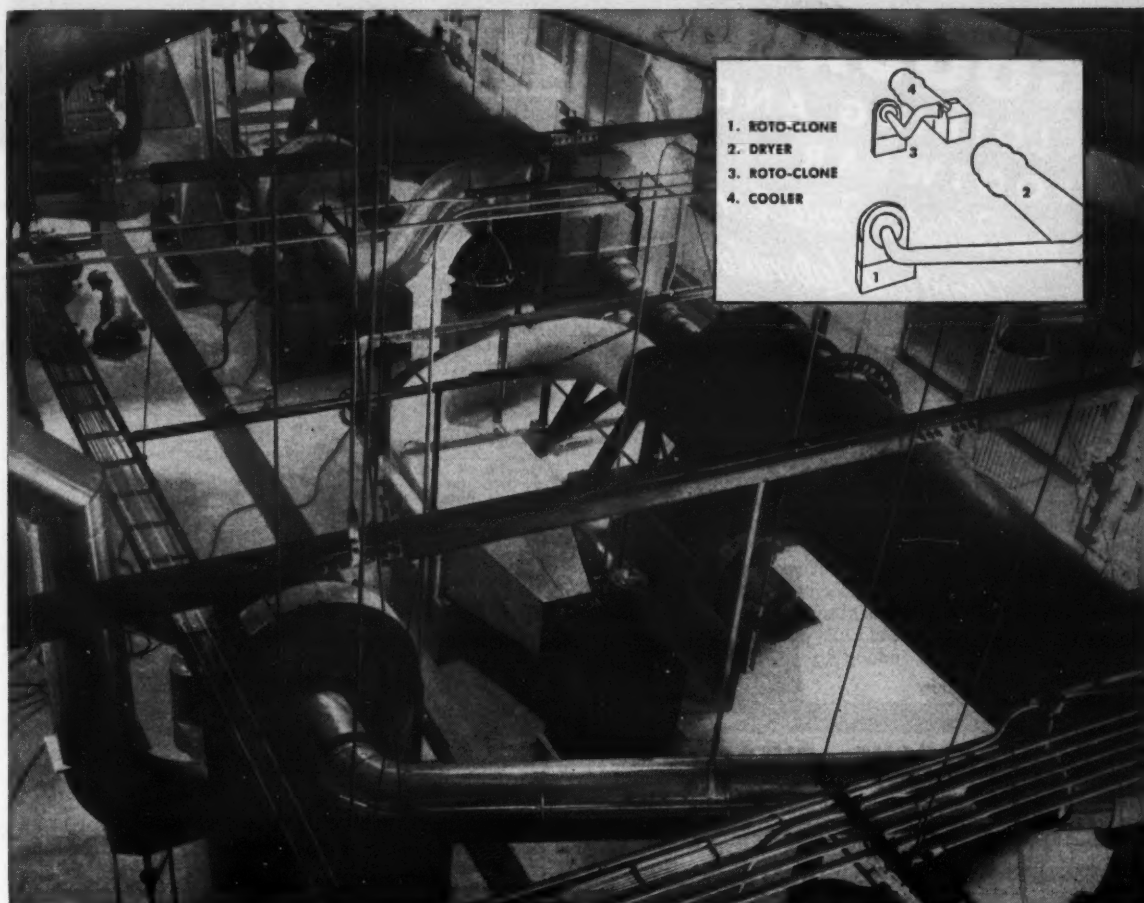
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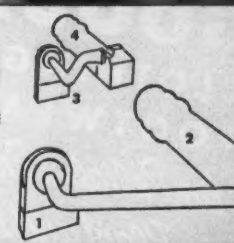
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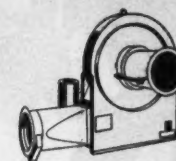
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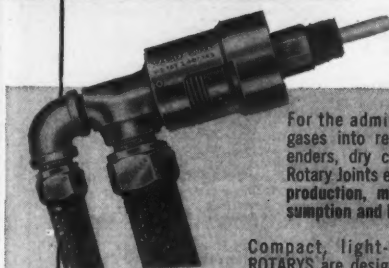
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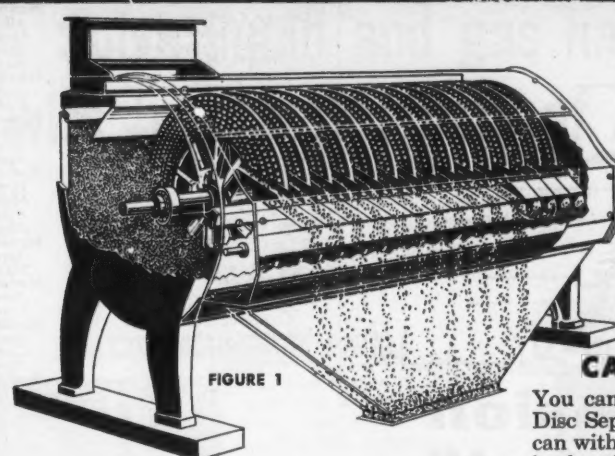


FIGURE 1

## FOR ACCURATE LENGTH SIZING OF FREE-FLOWING GRANULAR MATERIALS



FIGURE 2

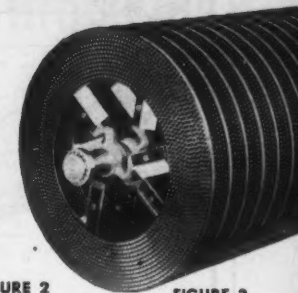


FIGURE 3

## CARTER DISC SEPARATORS

You can size free-flowing materials with Carter Disc Separators much more accurately than you can with screens. That's because Carter discs size by length differences. In each disc there are hundreds of under-cut pockets which lift short material and reject long material that does not fit into the pockets. Fig. 1 shows how material flows through the Disc Separator. Fig. 2 shows how the discs lift or reject. A series of discs is shown in Fig. 3. Sizes of Carter Disc Separators differ in the number of discs and in the diameter of the discs, and there is a wide range of pocket sizes and styles.

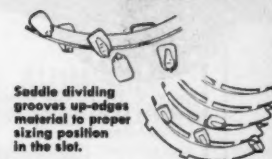
## HART UNI-FLOW CYLINDER SEPARATORS



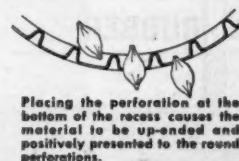
While Disc Separators perform precise separations, Uni-Flow Cylinder Separators are recommended when you need less accuracy or more flexibility. In the Uni-Flow Separator the material is lifted by semi-spherical indenters (A) that line the inside surface of the cylinder. The operator controls the separation by raising or lowering the separating edge (C) of the trough (B) into which the lifted material falls.

## CARTER PRECISION GRADERS For Sizing by Thickness or Width

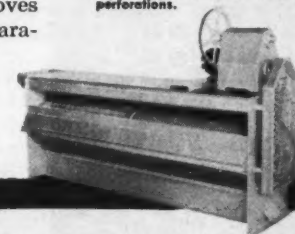
Because of the unique design of the perforated cylinders used in Carter Precision Graders, these machines make separations to a degree of accuracy hitherto unobtainable. Thickness separations are made by slots at the bottom of grooves in the cylinder. Width separations are made by recessed round perforations in the cylinder.



Saddle dividing grooves up-edges material to proper sizing position in the slot.



Placing the perforation at the bottom of the recess causes the material to be up-ended and positively presented to the round perforations.



**FREE TESTING** You are invited to send—or bring—samples of your materials to the Hart-Carter laboratory for free testing. (Ask us about the size sample required.) Results will be kept confidential. Knowing your requirements, Hart-Carter will recommend the machines you need. Hart-Carter machines are being used to size such materials as polyethylene and nylon cubes, and catalyst pellets. **WRITE FOR FOLDERS** that describe in detail the sizing methods used by each kind of machine.

**HART-CARTER CO.**

677 19th Avenue N.E., Minneapolis 18, Minn.  
 Phone: Sterling 9-2417

**MACHINERY FOR SIZING FREE-FLOWING GRANULAR MATERIALS BY DIMENSIONAL DIFFERENCES**

When inquiring check 7938 opposite last page



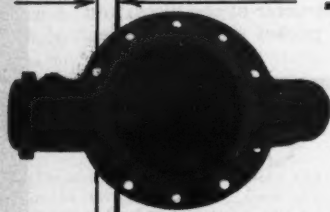


## When corrosion "gets your goat"

use this corrosion barrier

STEEL RUBBER

... for Linings

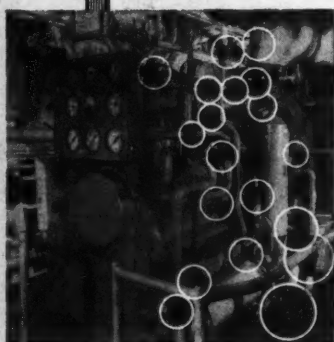


Typical of the intricate shapes lined with La Favorite protective elastomer compounds.

Aggravating, isn't it, when corrosion causes a shut-down for replacement in a critical processing line. End this nuisance now—economically. Line your processing equipment, fluid conveying lines and storage resources with La Favorite high-bond-strength elastomer protective compounds. It pays well. Data sheets? We await your request.

ALL RUBBER

... for Expansion Joints



Nineteen La Favorite expansion joints in this naval power plant block the shivers in pipe lines.

Tremble and shake—stretch and shrink—do these uncontrolled actions in your pipe lines give you the shivers? Don't let them "get your goat" any longer. Insert La Favorite All-Rubber Expansion joints where needed and calm your lines for better performance. Data sheet tells all.

Ask for it today.

# LA FAVORITE *Rubber Mfg. Co.*

267 Wagaraw Road • Hawthorne, New Jersey

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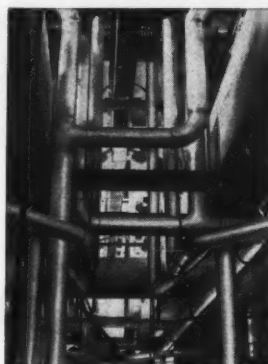
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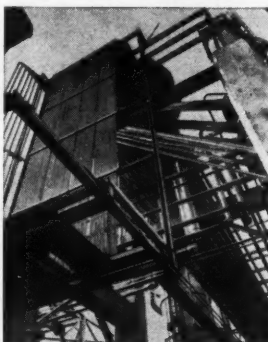
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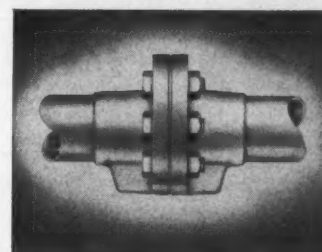
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Unitrace eliminates the cost of external steam jackets or steam tracer tubes because the steam line is an integral part of the aluminum pipe. It can cut your labor-installation costs by as much as 30%, and it will reduce (or even eliminate) the cost of thermal insulation for the lines.

The outstanding corrosion resistance natural to aluminum makes Unitrace ideally suited to the handling of naval stores, molten sulfur, ammonium nitrate solutions and other fluids normally requiring steam tracing. It lends itself to easy shop fabrication of standard lengths and can be formed with ordinary pipe-bending tools. A two-inch pipe size is standard and larger sizes are subject to special inquiry.

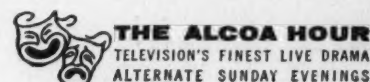
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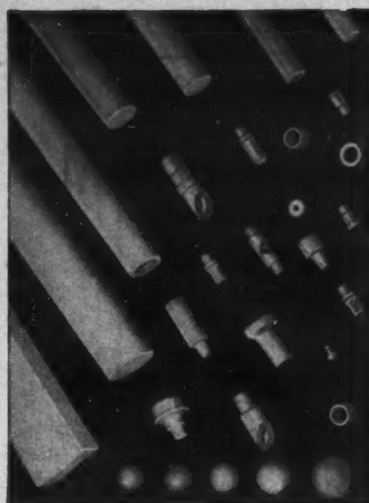
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## Check These Properties

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Completely unaffected by acids, alkalis and solvents — all chemicals except molten alkali metals and fluorine.

### HEAT RESISTANT

Continuous service up to 500° F.

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The tackiest of materials show little tendency to stick to Teflon.

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Resists erosion by impinging fluid to a high degree.

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Either against itself or other materials.

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Absolutely weather resistant.

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At high temperatures and frequencies.

WE CAN OFFER PROMPT DELIVERY ON Sheet • Tape • Rod • Tube • Special Machined and Molded Parts, Spray Coatings • Mechanical Packings

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Main Products

Rating of Company

Street Address of Company

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7303	Corrosion-resistant Welding Fitting	7367b	Phthalic Anhydride	7411a	Dial Thermometers	7454d	Diglycolic Acid	7517	Pumps
7304	Shovel Loaders	7367c	Maleic Anhydride	7411b	Recording Thermometers	7454e	Hydroxyacetic Acid	7518	Rubber-lined Chemical Pump
7305	Continuous Centrifugal Filter	7367d	Fumaric Acid	7412a	Industrial Thermometers	7454f	Cyclohexanone	7519	Paint Pump
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7307b	Plastic Coatings	7367g	Aromatics	7412d	Temperature Indicator	7455	Check Valves	7522	Condenser Tube Alloys
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7309	Muller-type Mixer	7367i	Picolines	7412f	Dynamometer Pyrometers	7457	Glycol Diether	7524	Vibrators
7310	High-pressure Lubricators	7367j	Sulphuric Acid	7412g	Electric Temperature Control	7458	Particle Bank	7525	Wire Cloth & Fabrications
7311	Starters	7367k	Ammonia Sulphate	7412h	Multi-Point Recorder	7459	Plant Models	7526	Scraper Storage Machines
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7314	Drum Rotator	7370	Emulsifier	7412k	Packless Valves	7461	Compressors	7529	Airveyor Pneumatic Conveyor
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SEPTEMBER 1954

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7627	Plastic Exhaust Blower	7694	Batch Centrifugals	7760d	Resin	7842	Pressure Switch	7917	Chromatographic Jars
7628	Centrifuges	7695	Speed Reducer	7761	Pipe & Fittings	7843	Concrete Gunning	7918	Water Stills
7629	Mixers	7696	Block Insulation	7761a	Heat Exchangers	7844	Dust Collector	7919	Epoxy-based Adhesives
7630	Moving-belt Filter	7697a	Corrosion-resistant Alloy Casting	7762	Flow Valves	7845	"Saving Old Roofs"	7920	Direct-fired Rotary Dryer
7631	Crusher	7697b	Alloy Sleeves	7763	Spray Nozzles	7846	Process Pump	7921	Pumps
7632	Impulse Steam Trap	7698	Dust Filter	7764	Pipe Joint Compound	7847	Glass Heat Exchangers	7922	Plastic Pipe
7633a	Filter Presses	7699	Flexible Couplings	7765	Gaskets, Shims & Washers	7848	Corrosion-resistant Products	7923	Rotary Dryer
7633b	Continuous Thickener	7700	Lubricated-plug Valves	7766	Separator-Filter	7849	V-belt Drives	7924	Liquid-level Control
7633c	Wax Molding Press	7701	Centrifugal Blower	7767	Flanges	7850	Mechanical Benders	7925	Dryers
7634	Diaphragm Pump	7702	Plates & Tubes for Fabrication	7768	Packing	7851a	Pilot Plant Homogenizer	7926	Electric Precipitator
7635	Water Softeners	7703	Stainless Valves	7769	Force-feed Lubricators	7852	Colloid Mill	7927	Fly Ash Collector
7636	Screen Separators	7704	Vibration Mount	7770	Perforated Metal Screen	7853	Diaphragm Pump	7928	Cyclones
7636a	Double-roll Grinder	7705	Beryllium-copper Wire	7771	Cylinder Mountings	7854	Roller Bearings	7929	Air Line Filters & Lubricators
7637a	Kilns	7706	Wire Cloth	7772	Steam Traps	7855	Signalling Equipment	7930	Plastic Pipe, Fittings & Valves
7637b	Continuous Calciner & Cooler	7707	Beryllium-copper Alloy	7773	Plate-type Heat Exchanger	7856	Metall Grating	7931	Protective Coating (state problem)
7638	Corrosion-resistant Casting	7708	Pumps	7774	Glass-reinforced Laminates	7857	Filter Presses	7932	Fluid Mixer
7639	Homogenizer	7709	Piston Rings	7775	Water Filters	7858	Revolving Joints	7933	Direct Flow Pump
7640a	Series A-712 Chlorinator	7710	Heater & Vaporizers	7776	Pelletizers	7859	Control Timers	7934	Needle Valve
7640b	Series A-711 Chlorinator	7711	Pulverizing Mills	7777	Adhesives for Wood	7860	Chromatography Applicators	7935	Liquid Indicator
7641	Dryer	7712	Evaporative Condenser	7778	Corrosion-resistant Fan	7861	Panel Meters	7936	Dust Control System
7642	Impervious Graphite Heat Exchanger (state type)	7713	Fan Platforms	7779	Silica Flattening Agents	7862a	Rotary Strainer	7937	Protective Clothing & Footwear
7643	Filters	7714	Admixtures for Cements	7780	Hardness Tester	7862b	Centrifuges	7938	Rotary Joint
7644	Solvent Extraction Column	7715	Control Valves	7781	Stitching Wire	7863	Screening Centrifuges	7939	Density Transmitter
7645	Rotary Batch Mixer	7716	Pressure Vessel & Process Equipment Fabrication	7782	Tube-type Molding Machine	7864	Industrial Aromatics & Chemicals	7940	Disc Separator
7646	Tubular Heaters	7717	Corrosion-resistant Pipe & Fittings	7783	Plug Valves	7865	Process Heating Equipment	7941	Cylinder Separator
7647	High-pressure Autoclaves	7718	Slurry Valve	7784	Wrought Iron	7866	Vacuum Forming	7942	Graders
7648	Concentrators	7719	Stainless Nickel & Monel Tube Fitting	7785	Titanium Dioxide	7867	Thermistor	7943	Elastomer Compound
7649a	Scintillation Spectrometer	7720	Mobile Dust Collector	7786	Plastic Laminates	7868	Visual Control Board	7944	Expansion Joint
7649b	Beta Counter	7721	Industrial Insulation	7787	"How to Prepack"	7869	Centrifugal-motor Pump	7945	Drain Valves
7650	Radio Isotopes	7722	Totally-enclosed Motor	7788	Finned Heat Exchanger Tube	7870	Tank Lining	7946	Aluminum Pipe
7651	Laboratory Mixers	7723a	Filter Cloth	7789	Flow Meters	7871	Resorcinol Formaldehyde Resins	7947	Aluminum Tube
7652	Laboratory Ovens	7723b	Filter Paper	7790	Metallized Ceramic Coatings	7872	Grinding Rods	7948	Heat Exchanger Tubes
7653	Diatomite Mineral Filler	7724	Enclosed AC Motors	7791	Water Treatment Systems	7873	Aerosol Filters	7949	Teflon
7654	Lab Extractor	7725a	Corrosion-proof Cement	7792a	Tube Cutter	7874	Diaphragm Valves	7950	Concrete Floor Patch
7655	Lab Still	7725b	Protective Coating	7793	Slings	7875	Lined Processing Vessel	7951	Tank Heater
7656	Proportional Counters			7794	DC Amplifier	7876	Silicon Carbide	7952	Corrosion-resistant Coating
7657a	Clarifiers			7795	Ventilator				
				7796	Liquid, Gas, Slurry Pump				
				7797	Strapping for Insulation				

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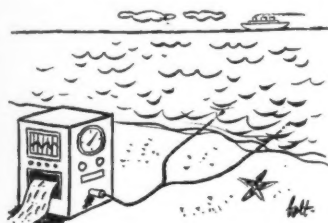
**THAT'S  
INTERESTING**

(Continued from page 2)

#### Time and tide . . .

. . . not only wait for no man, but the tide predicting machine operated by the Coast and Geodetic Survey of the Dept. of Commerce no longer needs human help in typing out tide table predictions.

A Fischer & Porter automatic logger now converts dial positions, formerly read and logged manually, into discrete



electrical contact combinations. These can operate output devices such as electric typewriters, tape punches, or magnetic tapes.

Predictor uses constituent tides, taken from actual tide history, movements of the sun or moon, and other factors to calculate maximum and minimum water heights, slack water time, and maximum velocity of both ebb and flood current for a given location.

#### High school students get inside view of industry operation

Students-in-Industry program, developed by American Can Co., brings students into the plant to work side by side with regular company managers and supervisors. Posts "filled" range from plant and district sales managers to assistant foremen, plant nurse, and key secretarial jobs. Students spend a full day, sitting in on all meetings, handling correspondence, preparing and signing daily reports, taking telephone calls, and ordering raw materials.

Day in the plant concludes a three to six week course in business functioning developed with a local high school.

For more information on product at right, specify 7945 . . . see information request blank opposite last page. ➤

# Brown Fintube

## Thermo-Flo TANK HEATERS

**Vertical mounting keeps the bottom of the tank uncluttered; prevents sediment from settling on the heating surface; permits the heater to be entirely immersed in the product; and avoids the loss in efficiency of trying to heat from a coil insulated in sediment on the tank bottom.**

The large surface area of the finned tubes permits more heat to be transferred at lower "skin" temperature. Product adjacent to the heater rises rapidly forming a thermal siphon in the tank, that assures efficient heating; prevents overheating; avoids stratification; and keeps the heating surface clean.

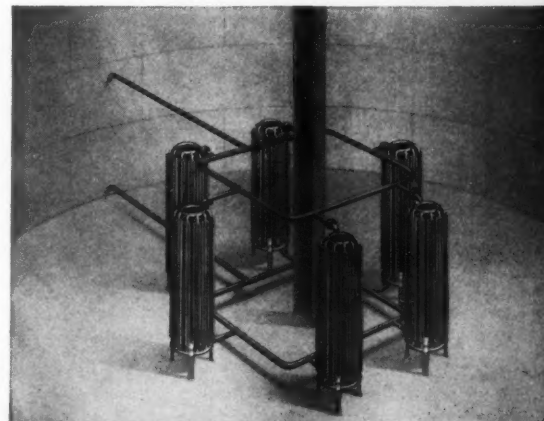
Mild steel, stainless or special metal construction. Can be stress relieved if desired. Easily installed in new tanks or tanks already in service. Used — and highly endorsed — by practically all large well-known companies maintaining tank farms.

*Bulletin No. 561 gives full details.*

**WRITE FOR A COPY TODAY!**



Above: View of Brown Fintube Thermo-Flo Tank Heater Showing the Legs that are Adjustable to Overcome any Unevenness of the Tank Bottom.



Six Thermo-Flo Tank Heaters Manifolded to a Single Steam Line in a Bunker C Storage Tank, Showing Bottom of the Tank Completely Open for Quick, Easy Cleaning.

## BROWN FINTUBE COMPANY

*Elyria, Ohio*

Engineering and Sales Representatives in the Principal Cities



## SOMEBODY GOOFED!

Only by a freak of fortune does the leaning tower of Pisa still stand. A faulty foundation was not apparent until the structure was three stories high. It is believed the architects were then forced to compensate by adding weight to the opposite side to save the building.

Are you building corrosion problems into your plant structures and equipment that will inevitably have to be compensated for by tremendous replacement costs? Many of these costs can be eliminated *at the planning stage* by taking advantage of the services of an expert in the field of corrosion resistant coatings... the Amercoat Sales Engineer.

The Amercoat Sales Engineer is trained in the principle that in corrosion engineering, too, foundations are all-important. You can put this factory-trained man on your staff, so to speak, without cost or obligation. His advice will be truly objective since it is based on a knowledge of all types of protective coatings and more than 43,000 case histories in our files. You can be sure that the Amercoat coating he recommends, whether vinyl, phenolic, epoxy or any other type, will be the right one for *your* job, and the most economical on the basis of cost per square foot per year.

Therefore, to effect important economies in specifying protective coatings you are cordially invited to call on your Amercoat Sales Engineer... *right at the beginning*. He will analyze all per-

tinent data concerning your corrosion problems based on our nearly 20 years of corrosion control experience, and give you a comprehensive recommendation. In addition to recommending the proper coatings, he will assist you in writing complete specifications. However, this is not the full extent of his service: he will also be available for consultation at the job site to insure proper application.

There are more than 70 Amercoat Sales Engineers and Distributors located throughout the country. It will pay you to talk to one of these men whether you are building a new plant or are interested in the efficient maintenance of existing facilities. The same service is available and equally important savings can be realized in both cases.

May we send you the name of the Amercoat man nearest you? Literature containing many helpful suggestions for the design and corrosion engineer is also available on request. Write to: Amercoat Corporation, 4809 Firestone Blvd., South Gate, Calif.

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